DETROIT INCINERATOR MONITORING PROGRAM

Data Report #3

Windsor Air Sampling Site

July 1987 - September 1988

Walpole Island Air Sampling Site

January 1988 - September 1988

River Road Environmental Technology Centre
Environment Canada, C&P
Ottawa, Ontario

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Executive Summary

Late in 1986, the Greater Detroit Resource Recovery Authority (GDRRA) announced that a 4000 ton/day municipal waste incinerator would be constructed in downtown Detroit, 6 km from the Canada - U.S. border. Electrostatic precipitators were proposed as pollution control equipment, rather than the wet scrubber - fabric filter combination currently considered to be best available control technology. Concern over the impact of emissions from the GDRRA incinerator on the air quality in Windsor led to the establishment of a monitoring program for toxic substances associated with incineration. Environment Canada, in co-operation with the Ontario Ministry of Environment and the Walpole Island Indian Band, set up two monitoring sites in Southwest Ontario, one located in downtown Windsor (operation commenced in July 1987) and the other located on Walpole Island (operation commenced January 1988). The current phase of the monitoring program is designed to gather background data prior to the startup of the GDRRA incinerator in the summer of 1989.

The program includes ambient air measurements of polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF), polychlorinated biphenyls (PCB), chlorobenzenes (CB), chlorophenols (CP), polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), inhalable particulate (IP) matter and metals. This report presents and discusses the available monitoring data for the aforementioned compounds from the Windsor monitoring site for the period July 1987 to September 1988 and from the Walpole Island monitoring site for the period January 1988 to September 1988.

The sampling and analytical protocols employed by the program resulted in the collection of very high quality data. Most of the compounds detected at the Windsor monitoring site were measured in quantities greater than the minimum detection level. PCDD and PCDF were detected at the Windsor site, but at levels well below Ontario's provisional ambient air guideline of 30 pg/m^3. At the Walpole Island site detectable levels of octa-PCDD were found in 6 out of 8 samples. Octa-PCDD levels were approximately 3 times lower than at Windsor.PAH levels detected in Windsor were found to be comparable to those in other North American urban centres. PCB were found at very low levels in Windsor, significantly lower than Ontario's annual ambient air quality guideline of 35 ng/m^3. At the Walpole Island site PCB levels were below detection for all except two samples. IP concentrations and sulphate concentrations were found to be high at both sites on some summer sampling days, but not in excess of the Provincial ambient air quality standards.

Subsequent data from the Windsor and Walpole Island monitoring sites will be reported on a regular basis.

Résumé Administratif

A la fin de l'année 1986, le Greater Detroit Resource Recovery Authority (GDRRA) a annoncé la construction d'un incinérateur de déchets municipaux pouvant traiter 3000 tonnes de déchets/jour, au centre-ville de Détroit, soit à 67 km de la frontière Canada-Etats-Unis. On a proposé d'utiliser des électrofiltres comme système de dépollution au lieu de la combinaison: épurateur par voie humide - filtres en tissu, que l'on considère actuellement comme la meilleure technique de dépollution. Les préoccupations soulevées par les effets des produits émis par l'incinérateur de GDRRA sur la qualité de l'air à Windsor ont suscité l'élaboration d'un programme de surveillance atmosphérique des substances toxiques provenant de l'incinération. Environnement Canada, en collaboration avec le ministère de l'Environnement de l'Ontario et la Bande Indienne de l'île Walpole, a établi deux stations de surveillance au sud-ouest de l'Ontario, l'une située au centre-ville de Windsor (en service depuis juillet 1987) et l'autre située sur l'île Walpole (en service depuis janvier 1988). La phase actuelle de programme de surveillance est destinée à recueillir des données de base avant la mise en marche de l'incinérateur du GDRRA, prévue pour l'été 1989.

Le programme comporte des mesures dans l'air ambiant des dibenzodioxines polychlorées (DDPC), des dibenzofurannes polychlorés (DFPC), des biphényles polychlorés (PC), des chlorobenzènes (CB), des chlorophénols (CP), des hydrocarbures aromatiques polycycliques (HAP), des matières organiques volatiles (MOV), des particules inhalables OPI) et des métaux. Le présent rapport expose et examine les données dont on dispose sur les mesures des composés mentionnés ci-dessus obtenues à la station de Windsor, durant la période allant de juillet 1987 à septembre 1988 et à la station de l'île Walpole durant la période allant de janvier 1988 à septembre 1988.

Les méthodes d'échantillonnage et d'analyse employées dans le cadre de ce programme ont permis de recueillir des données de très grande qualité. La plupart des composés ont été mesurés en quantités au delà du niveau de détection à la station de Windsor. Des DDPC et des DFPC ont été décelés dans cette station mais à des concentrations bien inférieures à 30 pg/m^3 qui est la directive provisoire de l'Ontario sur la qualité de l'air ambiant. A la station de l'île Walpole, des niveaux détectables d'octa DDPC ont été décelés dans 6 de 8 prélèvements. Les niveaux octa-DDPC étaient approximativement trois fois moindre que ceux de Windsor. Les concentrations de HAP trouvées à Windsor étaient comparables à celles trouvées dans d'autres centres urbains d'Amérique du Nord. Les BPC à Windsor ont été décelés à de très faibles concentrations, nettement inférieures à la directive annuelle de l'Ontario de 35 ng/m^3 sur la qualité de l'air ambiant. A la station de l'île Walpole, les niveaux de BPC étaient inférieurs des niveaux détectables pour tous sauf deux prélèvements. Les concentrations de PI et de sulfates étaient élevées aux deux stations durant certains jours d'échantillonnage en été, mais n'étaient pas supérieures aux normes provinciales sur la qualité de l'air ambiant.

Les données recueillies ultérieurement dans les stations de surveillance de Windsor et de l'île Walpole, seront consignées sur une base régulière.

Table of Contents

EXECUTIVE SUMMARY i

RÉSUMÉ ADMINISTRATIF ii

BACKGROUND 1

SAMPLING SITES 1

PARAMETERS MEASURED and SAMPLING METHODS 1

RESPONSIBILITIES and CONTACTS 4

AVAILABLE DATA 4

RESULTS 4

- Method of Calculation 4
- PCDD and PCDF 4
- PAH 9
- PCB, CB and CP 14
- VOC 18
- Inhalable Particulate Matter and Associated Elements and Ions 18
- Effect of Meteorological Variables on Measured Concentrations 24
- Quality Assurance 37

REFERENCES 41

APPENDICES

- **A** Available Sampling Data for Windsor and Walpole Island Sites
- **B** Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans
- **C** Polycyclic Aromatic Hydrocarbons
- **D** Polychlorinated Biphenyls, Chlorinated Benzenes and Chlorinated Phenols
- **E** Volatile Organics
- **F** Inhalable Particulate Matter, Sulphate, Nitrate and Multi-element
- **G** Meteorological Parameters and Concentrations of Selected Parameters by Wind Direction

List of Tables

1	Environment Canada Ambient Monitoring Protocols Windsor / Walpole Island	5
2	Breakdown of Responsibilities for Detroit Incinerator Monitoring Program	6
3	Measured Concentrations (pg/m3) of PCDD and PCDF -Windsor	7
4	Measured Concentrations (pg/m3) of PCDD and PCDF - Walpole	8
5	Comparison of Reported PCDD / PCDF Concentrations (pg/m3) from Selected Sites	10
6	Concentrations (ng/m3) of PAH at Windsor	11
7	Concentrations (ng/m3) of PAH at Walpole	12
8	Comparison of Benzo(a)Pyrene Concentrations in Canada and U.S. Urban Areas	13
9	Concentrations (ng/m3) of PCB, CB and CP at Windsor	15
10	Concentrations (ng/m3) of PCB, CB and CP at Walpole	16
11	Properties of Selected Aroclors	17
12	Concentrations of Selected VOC - Windsor	19
13	Concentrations of Selected VOC - Walpole	20
14	Comparison of Benzene Concentrations at Canadian Monitoring Sites	21
15	Inhalable Particulate and Inorganic Compound Concentration - Windsor	22
16	Inhalable Particulate and Inorganic Compound Concentration - Walpole	23
17	Mean Concentrations of Selected Compounds or Compound Category Totals by Wind Quadrant - Windsor	34
18	Mean Concentrations of Selected Compounds or Compound Category Totals by Wind Quadrant - Walpole	35
19	Mean Concentrations of Selected Compounds or Compound Category Totals by Season	36

20 PCDD / PCDF Results - Windsor /Detroit - EC - Weston Comparison 38

21 PAH Results - Windsor / Detroit - EC - Weston Comparison 39

22 PCB Results - Windsor / Detroit - EC - Weston Comparison 40

List of Figures

1 Windsor Monitoring Site Location 2

2 Location of Windsor and Walpole Island Monitoring Stations 3

3 Wind Rose for Sampling Days at Windsor 25

4 Wind Rose for Sampling Days at Walpole 26

5 Mean Concentration of Inhalable Particulate Mass by Wind Direction - Windsor 27

6 Mean Concentration of Inhalable Particulate Mass by Wind Direction - Walpole 28

7 Mean Concentration of Total PAH by Wind Direction -Windsor 29

8 Mean Concentration of Total PAH by Wind Direction -Walpole 30

9 Relationship between PCB and Temperature - Windsor 31

10 Relationship between CP and Temperature - Windsor and Walpole 32

11 Relationship between CB and Temperature - Windsor and Walpole ... 33

BACKGROUND

Late in 1986, the Greater Detroit Resource Recovery Authority (GDRRA) began construction of a municipal waste incinerator in downtown Detroit. The facility is designed to receive and process a maximum of 4,000 tons of municipal solid waste per day. Typically, 3,300 tons of solid waste will be processed five days a week to produce refuse derived (RDF) fuel. Seven days a week, 2,400 tons of RDF will be used as boiler fuel for the production of steam and electricity. The facility is located only 6 km from the Canada-United States border and pollution control equipment consists of electrostatic precipitators rather than the wet/dry scrubber - fabric filter combination considered best available control technology. These factors have created public concerns over the potential impacts of the incinerator on air quality in Windsor and surrounding area.

In response to these concerns, Environment Canada established a monitoring program in the Windsor area for toxic substances associated with incineration. Monitoring is being conducted at a site in Windsor in co-operation with the Ontario Ministry of the Environment and at a site on Walpole Island in Lake St. Clair in co-operation with the Walpole Island Band Council. Monitoring began in Windsor in July 1987 and on Walpole Island in January 1988. The current phase of the monitoring program is designed to gather background data prior to the commercial operation of the GDRRA plant scheduled to begin in May 1989.

This report is the third in a series of data reports.[1,2] Available monitoring data from the Windsor site for the period July 1987 to September 1988 and for the Walpole Island Site for the period January 1988 to September 1988 will be presented and discussed.

SAMPLING SITES

Sampling in Windsor is taking place at the Ontario Ministry of Environment monitoring site at 471 University Avenue (OME Site No. 12008). This site also reports data to the National Air Pollution Surveillance (NAPS) network (NAPS site 60204). The site is located approximately 6 km south of the GDDRA incinerator (*see Figure 1*). Modelling studies conducted by the OME show that the site is located in the area of Windsor that would be most impacted by the emissions from the GDRRA incinerator.

The Walpole Island site is in a rural area on St. Anne's Island, approximately 55 km ENE of the GDRRA facility (*see Figure 2*). The site was chosen to represent background conditions with no nearby industrial or transportation source impacts.

PARAMETERS MEASURED and SAMPLING METHODS

The 471 University Avenue site is also a fully instrumented OME monitoring station. Parameters measured by OME include sulphur dioxide, carbon monoxide, ozone, nitric oxide, nitrogen dioxide, total and reactive hydrocarbons and total suspended particulates.

The Environment Canada toxics sampling effort at both sites consists of ambient air measurements of polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF), polychlorinated biphenyls (PCB), chlorinated benzenes (CB), chlorinated phenols (CP), polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), inhalable particulate (IP) matter and associated inorganic compounds. A summary of the

FIGURE 1 - WINDSOR MONITORING SITE LOCATION

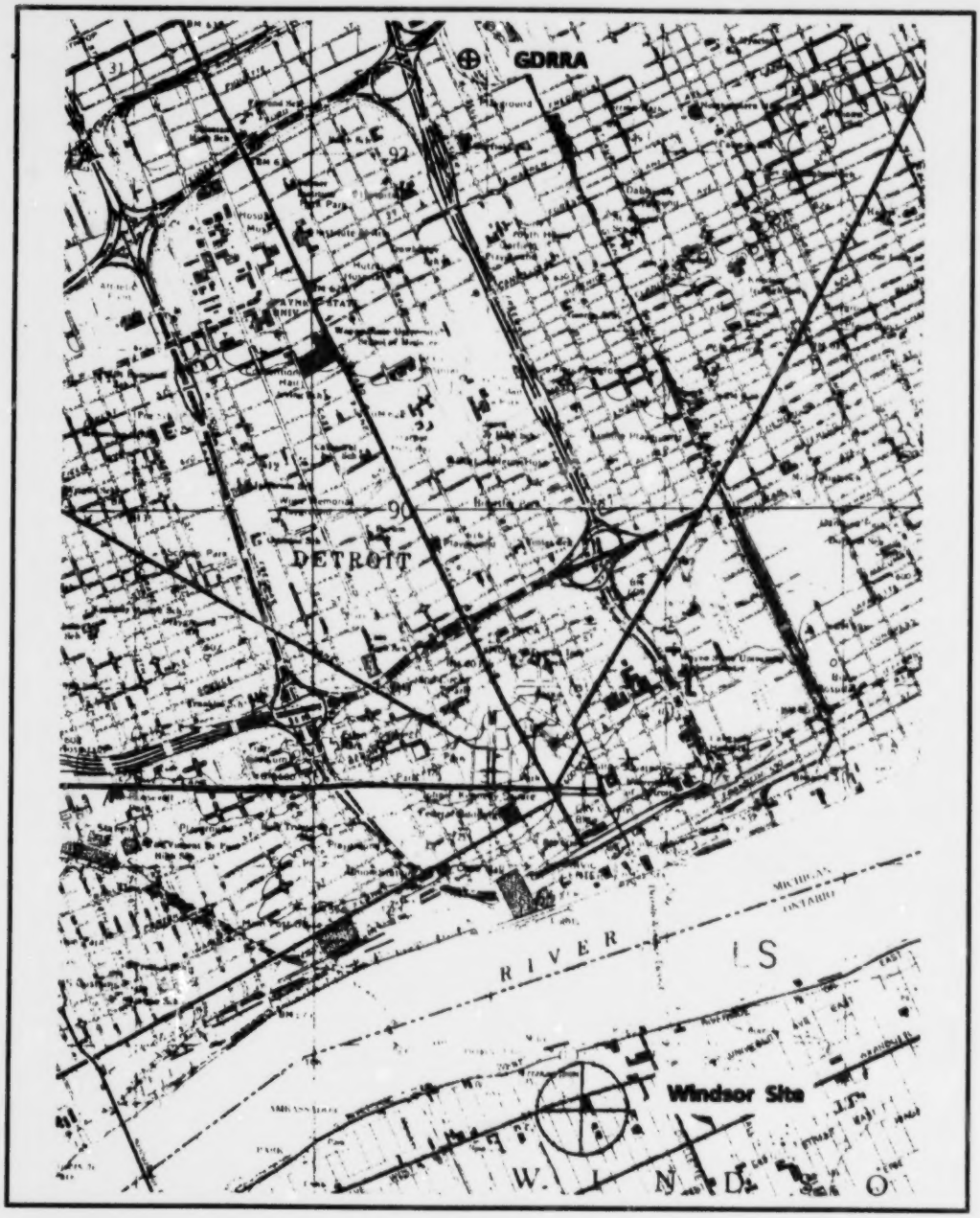
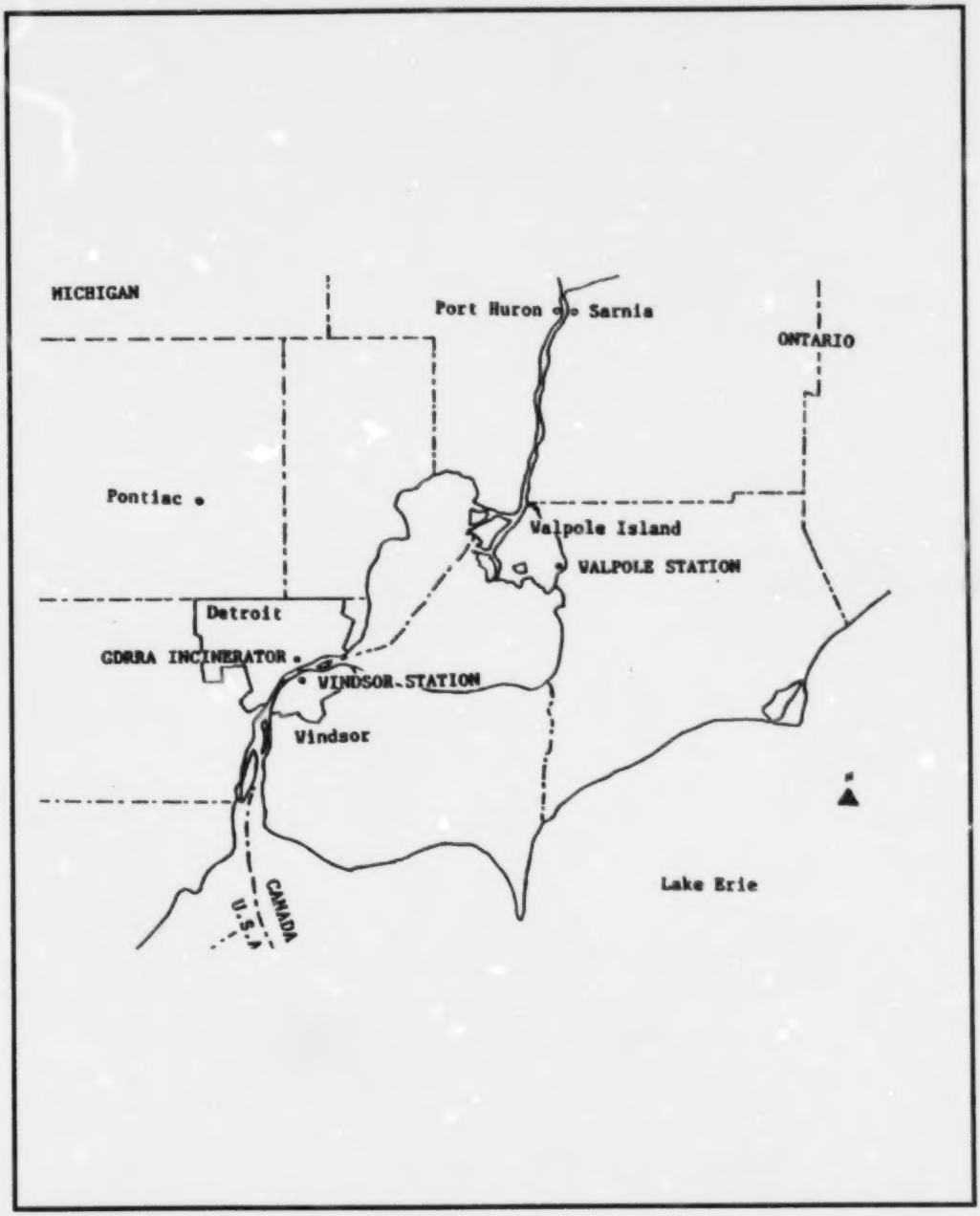


FIGURE 2 - LOCATION of WINDSOR and WALPOLE ISLAND MONITORING STATIONS



monitoring protocols employed for each parameter, the target detection levels and the sampling frequency is given in *Table 1*. All samples were collected over a 24 h period (midnight to midnight). Most of the compounds included in the Environment Canada measurement program are known to be components of municipal waste incinerator stack emissions, although there are many other sources of most of these compounds in the Windsor-Detroit area. Many of the volatile organic and particulate elemental species measured will be useful in identifying sources contributing to toxic pollutant concentrations at the Windsor and Walpole Island sites.

The Windsor area monitoring effort is the most comprehensive toxics sampling program currently underway in Canada. For many of the species measured, it is the first time in Canada that an attempt has been made to identify them and quantify them in urban or rural air.

RESPONSIBILITIES and CONTACTS

Five separate responsibility centres and a large number of individuals are participating in this air quality monitoring program. A breakdown of responsibilities and appropriate contacts is given in *Table 2*.

AVAILABLE DATA

A summary of the available data included in this report is given in *Table A1* of Appendix A for Windsor and in *Table A2* of *Appendix A* for Walpole Island. Due to operational problems, samplers did not always run on scheduled sampling days.
A summary of the results from the sampling program is provided in the following sections. Detailed descriptions of sampling and analytical procedures, quality control and daily concentration values by compound category are provided in the Appendices.

RESULTS

Method of Calculation

There is no completely satisfactory method of handling values below method detection levels for the purposes of calculating summary statistics. In this report, each summary table contains the number of values less than detection levels and the mean detection levels for each compound or compound category. For the purposes of calculating the mean, a number equal to half the detection level was substituted in the data set when values were below detection. Means are not reported when more than 60% of the values were below detection. Where total concentrations of compound categories (ie total PAH, total PCDD, etc.) are reported, these have been computed from the sum of values above detection, values below the detection limit were effectively set to zero.

PCDD and PCDF

Isomer specific analyses were not conducted for PCDDs and PCDFs; results are reported by homologue subgroup. Five homologue groups based on the degree of chlorination (Cl_4 through Cl_8: tetra through octa) are reported for both PCDDs and PCDFs. Summary statistics for vapor plus particulate phase PCDDs and PCDFs for 13 sampling days for the Windsor site are given in *Table 3* and for 8 sampling days for the Walpole Island site in *Table 4*. Method descriptions, quality assurance results (ie. recoveries, blanks and detection levels), particulate/vapor phase distribution data, and daily concentration data are contained in *Appendix B*.

TABLE 1 - ENVIRONMENT CANADA AMBIENT MONITORING PROTOCOLS - WINDSOR / WALPOLE ISLAND

COMPOUND	NO. of SPECIES or ISOMER GROUPS MEASURED	SAMPLING METHOD	ANALYTICAL METHOD	TYPICAL SAMPLE VOLUME (24 h)	TARGET DECTION LEVEL	SAMPLE COLLECTION
PCDD/PCDF	10	Hi-Vol/PUF	GC-MS	1000 m^3	0.05 - 0.20 pg/m^3	every 24 d
PCB	10	Hi-Vol/PUF-XAD	GC-MSD	650 m^3	0.04 - 0.08 ng/m^3	every 12 d
CB [1]	4	Hi-Vol/PUF-XAD	GC-MSD	650 m^3	0.02 ng/m^3	every 12 d
CP	4	Hi-Vol/PUF-XAD	GC-MSD	650 m^3	0.06 - 0.12 ng/m^3	every 12 d
PAH	28	Hi-Vol/PUF or PUF-XAD	GC-MSD	1000 m^3 or 650 m^3	0.02 - 0.05 ng/m^3	every 6 d
Particulates (PM_{10})	--	Dichotomous	Gravimetric	24 m^3	1 $\mu g/m^3$	every 6 d
Elements & Ions	42	Dichotomous	EDXRF & IC	24 m^3	1 - 50 ng/m^3	every 6 d
VOC	90	Evacuated Canister	GC-FID/MSD	16 L	0.1 $\mu g/m^3$	every 6 d

[1] Di-chlorobenzenes are sampled as VOC

Note: PCB, Chlorinated Phenols, Chlorinated Benzenes were sampled at the same time with the same sampler. Split extract scheme used. At times PAH was also determined from the same sample.

TABLE 2 - BREAKDOWN of RESPONSIBILITIES for DETROIT INCINERATOR MONITORING PROGRAM

AGENCY	SUBGROUP	RESPONSIBILITY	CONTACT
Environment Canada	Pollution Measurement Division OTTAWA	1. Sampler Construction 2. Sampler Maintenance 3. Sample Preparation 4. VOC Analysis 5. Report Preparation, Data Analysis, Co-Ordination	1&2. J. Mar (613) 998-4705 3&4. D. Wang (613) 998-4705 5. T. Dann* (613) 998-4705
	Chemistry Division OTTAWA	1. Dioxin, PCB, PAH, CP,CB Analysis 2. Multi-element Analysis	1. C. Chiu (613) 998-3671 2. J. Dlouhy (613) 998-3671
	Ontario Regional Office TORONTO	1. Program co-ordination and program management	1. E. Bobet* (416) 973-1067 M.F. Bérard* (416) 973-1068
Ontario Ministry of the Environment	Southwest Regional Office LONDON	1. Sampler operation and maintenance 2. Continuous monitors and meteorological data	1&2. G. Grosse (519) 681-3600
Walpole Island Indian Band	Walpole Island Environmental Centre	1. Sampler operation and maintenance for Walpole Island	1. M. Williams (519) 627-8131

* Primary points of contact to discuss program and report contents

TABLE 3 - MEASURED CONCENTRATIONS (pg/m^3) of PCDD and PCDF WINDSOR (July 1987 - September 1988 - 13 Sampling Days)

PARAMETER	NO. < DETECT	MEAN DETECTION LEVEL*	MEAN	STD. DEV	MEDIAN	MAX.	MIN.
T_4CDD	12	0.06	--	--	ND	0.03	ND
P_5CDD	11	0.16	--	--	ND	0.15	ND
H_6CDD	5	0.16	0.32	0.45	0.24	1.66	ND
H_7CDD	2	0.21	0.64	0.66	0.42	2.15	ND
O_8CDD	0	--	1.19	0.81	0.90	3.29	0.43
Total PCDD	0	--	2.12	1.79	1.42	7.09	0.43
T_4CDF	4	0.12	0.21	0.22	0.19	0.78	ND
P_5CDF	7	0.08	0.09	0.09	ND	0.31	ND
H_6CDF	7	0.10	0.10	0.10	ND	0.30	ND
H_7CDF	8	0.09	0.08	0.07	ND	0.19	ND
O_8CDF	6	0.20	0.13	0.10	0.12	0.36	ND
Total PCDF	1	--	0.46	0.44	0.40	1.19	ND
Sample Volume (m^3)			1191	470	1000	1966	532

ND - less than detection
* Calculated for samples below detection only

TABLE 4 - MEASURED CONCENTRATIONS (pg/m^3) of PCDD and PCDF WALPOLE ISLAND (January 1988 - September 1988 - 8 Sampling Days)

PARAMETER	NO. < DETECT	MEAN* DETECTION LEVEL	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
T_4CDD	8	0.07	--	--	ND	ND	ND
P_5CDD	8	0.19	--	--	ND	ND	ND
H_6CDD	7	0.18	--	--	ND	0.10	ND
H_7CDD	4	0.17	0.19	0.16	ND	0.40	ND
O_8CDD	2	0.23	0.38	0.34	0.29	0.96	ND
Total PCDD	2	--	0.51	0.53	0.29	1.30	ND
T_4CDF	7	0.05	--	--	ND	0.12	ND
P_5CDF	8	0.07	--	--	ND	ND	ND
H_6CDF	8	0.10	--	--	ND	ND	ND
H_7CDF	8	0.07	--	--	ND	ND	ND
O_8CDF	8	0.14	--	--	ND	ND	ND
Total PCDF	7	--	--	--	ND	0.12	ND
Sample Volume (m^3)			765	127	703	1028	656

ND - less than detection
* Calculated for samples below detection only

Octa-CDD was detected in all samples at the Windsor site and along with hepta-CDD accounted for most of the total PCDD concentrations. Tetra-CDD were detected in only one sample at a concentration level of 0.03 pg/m^3. The maximum total PCDD concentration of 7.1 pg/m^3 was measured on February 3, 1988. Mean concentrations of PCDF homologues were near the method detection levels with tetra-CDF having the highest mean concentration. The maximum total PCDF concentration of 1.2 pg/m^3 was also measured on February 3, 1988.

At the Walpole Island site, most CDD and CDF homologues were below detection. Detectable levels of octa-CDD were found in 6 out of 8 samples; the mean concentration of octa-CDD was approximately 3 times lower than the mean concentration at the Windsor site. Only one Walpole Island sample had detectable levels of PCDF.

There are no national air quality objectives for PCDD or PCDF. Ontario has a provisional ambient air guideline for 2,3,7,8-TCDD of 30 pg/m^3 not to be exceeded on average over a year. The Federal-Provincial Multimedia Guidelines Advisory Committee has recommended a value of 5 pg/m^3 for 2,3,7,8-TCDD (toxic equivalent) as a one year average to protect human health. A comparison of Windsor and Walpole Island data with results from one site in Toronto[3] and from a number of sites in the State of North Rhine-Westfalia in West Germany[4] is given in *Table 5*.

Polycyclic Aromatic Hydrocarbons (PAH)

Concentrations of 28 PAH compounds (26 resolved peaks) were measured at both sites. Data are available for 55 sampling days at the Windsor site (*Table 6*) and for 26 days at the Walpole Island site (*Table 7*). An analytical method description, quality assurance, particulate/vapor phase distribution data and daily concentration data for each site are contained in *Appendix C*. Collection efficiencies for acenapthylene, acenapthene and fluorene on sampling days with high temperature are poor for samples collected with PUF alone (almost half of the samples at each site). Duplicate PAH samples were also collected on a number of sampling days at both sites and the data is given in *Appendix C*.

At the Windsor site, phenanthrene, fluoranthene and pyrene had the highest mean concentrations; these compounds were found predominantly in the vapor phase. Of the higher molecular weight compounds found as particulate on the filter samples, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene were measured in the highest concentrations. Benzo(a)pyrene concentrations ranged from 0.05 to 3.32 ng/m^3 with a mean of 0.61 ng/m^3. A maximum total PAH concentration of 351 ng/m^3 was measured on May 9, 1988.

Walpole Island PAH concentrations were an order of magnitude lower than those measured at Windsor, although most of the compounds were above detection level on the majority of sampling days. Phenanthrene had the highest mean concentration. The mean benzo(a)-pyrene concentration was 0.06 ng/m^3.

The province of Ontario has set a provisional guideline for benzo(a)-pyrene in ambient air of 0.3 ng/m^3 (annual average). The State of Michigan has established an annual average environmental acceptability level for PAH (as benzo(a)pyrene) of 0.3 ng/m^3. The environmental acceptability level is considered a guideline and is used in screening permit applications for new facilities.

A number of measurement programs for PAH have been carried out in Canadian cities and in other areas in North America. A comparison of some recently reported benzo(a)pyrene concentration data is provided in *Table 8*.[6]

TABLE 5: COMPARISON of REPORTED PCDD / PCDF CONCENTRATIONS (pg/m^3) from SELECTED SITES

HOMOLOGUE GROUP	CANADA			WEST GERMANY
	WINDSOR (n = 13)	WALPOLE ISLAND (n = 8)	TORONTO (n = 3)	NORTH RHINE + (n = 33)
T_4CDD	<0.06	<0.07	<0.06	<0.02
P_5CDD	<0.05	<0.20	--	0.51
H_6CDD	0.32	<0.20	<0.10	0.61
H_7CDD	0.64	0.19	0.55	1.14
O_8CDD	1.19	0.38	1.20	0.98
T_4CDF	0.21	<0.05	0.14	1.63
P_5CDF	0.09	<0.07	<0.07	1.55
H_6CDF	0.10	<0.10	<0.10	0.79
H_7CDF	0.08	<0.07	<0.08	1.02
O_8CDF	0.13	<0.14	<0.20	0.49

+ Eleven different sites

TABLE 6 - CONCENTRATIONS (ng/m^3) of PAH at WINDSOR (July 1987 - September 1988 - 55 Sampling Days)

COMPOUND	NO.< DETECT	MEAN	STD. DEV.	MEDIAN	MAXIMUM	MINIMUM
Acenaphthylene	0	5.12	6.22	3.04	27.15	0.08
Acenaphthene	1	6.26	11.25	2.29	59.99	ND
Fluorene	0	6.83	6.71	3.72	30.74	1.26
2-Methyl-Fluorene	1	5.18	2.71	4.53	13.84	ND
Phenanthrene	0	33.51	24.90	26.49	136.97	0.23
Anthracene	17	3.28	5.30	0.83	24.83	ND
Fluoranthene	0	10.55	8.01	7.75	39.02	1.26
Pyrene	0	6.58	4.83	4.76	22.00	0.61
Benzo(a)Fluorene	1	1.14	1.19	0.75	5.91	ND
Benzo(b)Fluorene	4	0.70	0.94	0.31	4.04	ND
1-Me-Pyrene	6	0.29	0.25	0.21	0.99	ND
Benzo(g,h,i)Fluoranthene	0	0.65	0.52	0.45	2.38	0.04
Benzo(a)Anthracene	3	0.88	1.19	0.35	5.33	ND
Chrysene & Triphenylene	0	1.87	2.06	0.92	11.18	0.15
7-Me-Benzo(a)Anthracene	55	--	--	ND	ND	ND
Benzo(b)Fluoranthene	0	2.92	2.56	2.08	10.72	0.18
Benzo(k)Fluoranthene	53	--	--	ND	1.85	ND
Benzo(e)Pyrene	0	0.78	0.73	0.51	3.08	0.05
Benzo(a)Pyrene	0	0.61	0.65	0.37	3.32	0.05
Perylene	15	0.09	0.12	0.06	0.69	ND
2-Methyl-Cholanthrene	52	--	--	ND	0.05	ND
Indeno(1,2,3-cd)Pyrene	2	1.04	1.05	0.61	5.23	ND
Dibenzo(a,c) & (a,h)Anthracene	36	--	--	ND	0.57	ND
Benzo(b)Chrysene	35	--	--	ND	0.38	ND
Benzo(g,h,i)Perylene	1	0.75	0.63	0.54	3.00	ND
Anthanthrene	29	--	--	ND	0.26	ND
TOTAL PAH	***0***	***89.16***	***68.57***	***65.3***	***350.7***	***21.06***
SAMPLE VOLUME (m^3)		***877***	***585***	***854***	***4957****	***427***

ND = less than detection limit of 0.01 to 0.05 ng/m^3

* 121 h sample

TABLE 7 - CONCENTRATIONS (ng/m^3) of PAH at WALPOLE ISLAND (January 1988 - September 1988 - 26 Sampling Days)

COMPOUND	NO.< DETECT	MEAN	STD. DEV.	MEDIAN	MAXIMUM	MINIMUM
Acenaphthylene	2	0.25	0.78	0.06	4.01	ND
Acenaphthene	3	0.37	0.41	0.17	1.72	ND
Fluorene	0	0.85	0.83	0.48	4.01	0.17
2-Methyl-Fluorene	1	0.85	0.50	0.79	1.90	ND
Phenanthrene	0	3.34	2.31	2.77	10.21	1.09
Anthracene	23	--	--	ND	2.01	ND
Fluoranthene	0	0.88	0.73	0.70	3.62	0.27
Pyrene	0	0.46	0.52	0.35	2.83	0.10
Benzo(a)Fluorene	4	0.07	0.10	0.05	0.53	ND
Benzo(b)Fluorene	14	0.04	0.06	ND	0.28	ND
1-Me-Pyrene	19	--	--	ND	0.19	ND
Benzo(g,h,i)Fluoranthene	9	0.06	0.10	0.04	0.48	ND
Benzo(a)Anthracene	9	0.05	0.06	0.03	0.26	ND
Chrysene & Triphenylene	3	0.18	0.18	0.15	0.72	ND
7-Me-Benzo(a)Anthracene	26	--	--	ND	ND	ND
Benzo(b)Fluoranthene	3	0.32	0.29	0.27	1.27	ND
Benzo(k)Fluoranthene	26	--	--	ND	ND	ND
Benzo(e)Pyrene	4	0.08	0.07	0.06	0.31	ND
Benzo(a)Pyrene	8	0.06	0.06	0.06	0.19	ND
Perylene	25	--	--	ND	0.04	ND
2-Methyl-Cholanthrene	26	--	--	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	11	0.07	0.09	0.03	0.40	ND
Dibenzo(a,c) & (a,h)Anthracene	23	--	--	ND	0.03	ND
Benzo(b)Chrysene	26	--	--	ND	ND	ND
Benzo(g,h,i)Perylene	9	0.06	0.07	0.06	0.28	ND
Anthanthrene	26	--	--	ND	ND	ND
TOTAL PAH	***0***	***8.06***	***6.37***	***6.74***	***31.24***	***2.84***
SAMPLE VOLUME (m3)		***738***	***303***	***697***	***2020***	***434***

ND = less than detection limit of 0.01 to 0.05 ng/m^3

TABLE 8 - COMPARISON of BENZO(a)PYRENE CONCENTRATIONS (ng/m^3) in CANADA and U.S. URBAN AREAS

CITY	No. of SAMPLES	SAMPLING PERIOD	MEAN CONCENTRATION (ng/m^3)
Walpole Island	26	Jan. 88 - Sept. 88	0.06
Windsor	55	July 87 - Sept. 88	0.6
Toronto	42	Oct. 84 - July 86	0.3
Montreal	29	Oct. 84 - May 86	0.6
Vancouver	14	Feb. 85 - Mar. 85	0.3
Newark, N.J.	30	Summer 1982	0.2*
Columbia, S.C.	13	Feb. 82 - Apr. 83	0.5
Los Angeles	~1000	Aug. 81 - Mar. 82	0.6

* geometric mean

Polychlorinated Biphenyls (PCB), Chlorobenzenes (CB) and Chlorophenols (CP)

For PCB, data are reported for 10 isomer groups (Cl_1 to Cl_{10}), chlorinated benzene data are reported for four isomer groups (Cl_3 to Cl_6) and chlorinated phenol data are reported for four isomer groups (Cl_2 to Cl_5). Data are available for 19 sampling days at the Windsor site (*Table 9*) and for 13 sampling days at the Walpole Island site (*Table 10*). Method descriptions, quality assurance results, particulate/vapor phase distributions and daily concentration data are reported in *Appendix D*.

Mean total PCB concentrations were 0.80 ng/m^3 at the Windsor site with tri- and tetra-chlorobiphenyls found in the highest concentrations. All PCB compounds were found in the vapor phase with no detectable concentration on the filter samples. At the Walpole Island site, PCB levels were below method detection values for all except two samples which contained tri-chlorobiphenyls at levels close to detection.

PCB's were manufactured over a period of 45 years (1929 to 1975) and were used as coolants and dielectric fluids in transformers and capacitors. The major manufacturer was Monsanto Corp. which sold them under the Aroclor trademark. Aroclors are mixtures of PCB isomers, different Aroclors contain different weight fractions of chlorine. Some common Aroclor compounds are shown in *Table 11*.[7] Although PCB's were banned for new usage in the mid-1970's, substantial quantities of PCB's are present in landfills and a large number of PCB containing capacitors and transformers are still in use. PCB's, especially those with high chlorine content are quite stable in the environment. Few measurements of PCB by isomer group in ambient air have been reported in North America or Europe. Concentrations of total PCB were reported to be 1.5 ng/m^3 in Columbia, South Carolina, 0.5 ng/m^3 in Denver, Colorado, 0.07 ng/m^3 in Stockholm, Sweden[8] and 1.4 ng/m^3 in Hamburg, West Germany.[9]

No national air quality objectives for PCB exist. The Ontario annual ambient air quality guideline for PCB is 35 ng/m^3. Michigan's annual average environmental acceptability level for PCB (Aroclor 1260) is 1 ng/m^3.[5]

The mean total chlorinated benzene concentration was 3.28 ng/m^3 at the Windsor site with trichlorobenzene accounting for ~80% of the total. It should be noted that recovery efficiencies for trichlorobenzene surrogates were poor and variable. Hexachlorobenzene (HCB) is potentially the most toxic of the chlorinated benzenes; mean HCB concentrations were 0.15 ng/m^3 at the Windsor site. The mean total chlorinated benzene concentration at the Walpole Island site was 1.9 ng/m^3 with trichlorobenzene accounting for ~80% of the total. Mean HCB concentrations were 0.16 ng/m^3, equal to the mean concentration measured at Windsor. No other Canadian ambient air concentration data for chlorinated benzenes were available. HCB levels were reported to be 0.29 ng/m^3 in Columbia, South Carolina, 0.24 ng/m^3 in Denver, Colorado, 0.6 ng/m^3 in Hamburg, West Germany[9] and 0.07 ng/m^3 in Stockholm, Sweden.[8] The State of Michigan annual average environmental acceptability level for HCB is 2 ng/m^3.[5]

Mean total chlorinated phenol levels were 1.88 ng/m^3 at the Windsor site and 1.44 ng/m^3 at the Walpole Island site. At the Windsor site, pentachlorophenol was measured in the highest concentrations; at Walpole Island dichlorophenols were measured in the highest concentrations. Mean pentachlorophenol concentrations of 0.67 ng/m^3 have been reported from a monitoring program carried out at 12 sites in Hamburg, West Germany.

TABLE 9 - CONCENTRATIONS (ng/m^3) of PCB, CB and CP at WINDSOR (July 1987 - September 1988 - 19 Sampling Days)

COMPOUND	NO.< DETECT.	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
CL_3-CB	2	2.64	2.04	2.32	7.53	ND
CL_4-CB	0	0.37	0.55	0.24	2.56	0.04
CL_5-CB	0	0.13	0.10	0.10	0.50	0.03
CL_6-CB	1	0.15	0.07	0.14	0.27	ND
Total CB	***0***	***3.28***	***2.46***	***2.70***	***9.72***	***0.53***
CL_1-PCB	19	--	--	ND	ND	ND
CL_2-PCB	9	0.06	0.09	0.03	0.35	ND
CL_3-PCB	0	0.25	0.20	0.16	0.73	0.03
CL_4-PCB	3	0.31	0.36	0.19	1.32	ND
CL_5-PCB	3	0.16	0.15	0.13	0.49	ND
CL_6-PCB	12	--	--	ND	0.18	ND
CL_7-PCB	18	--	--	ND	0.06	ND
CL_8-PCB	19	--	--	ND	ND	ND
CL_9-PCB	19	--	--	ND	ND	ND
CL_{10}-PCB	19	--	--	ND	ND	ND
Total PCB	***0***	***0.80***	***0.68***	***0.63***	***2.40***	***0.03***
CL_2-Phenol	1	0.65	0.59	0.47	2.39	ND
CL_3-Phenol	6	0.13	0.12	0.12	0.42	ND
CL_4-Phenol	6	0.25	0.26	0.11	0.82	ND
CL_5-Phenol	5	0.87	0.92	0.75	3.19	ND
Total CP	***2***	***1.88***	***1.64***	***1.52***	***4.67***	***ND***
SAMPLE VOLUME (m^3)		***654***	***138***	***631***	***988***	***476***

ND = less than detection level of 0.03 ng/m^3 for CB and CP
= less than detection limit of 0.03 to 0.06 ng/m^3 for PCB

TABLE 10 - CONCENTRATIONS (ng/m^3) of PCB, CB and CP at WALPOLE ISLAND (January 1988 - September 1988 - 13 Sampling Days)

COMPOUND	NO.< DETECT.	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
CL_3-CB	0	1.48	0.99	1.52	3.90	0.38
CL_4-CB	0	0.19	0.10	0.18	0.42	0.05
CL_5-CB	1	0.07	0.05	0.06	0.18	ND
CL_6-CB	0	0.16	0.07	0.15	0.29	0.03
Total CB	**0**	**1.90**	**1.09**	**1.94**	**4.36**	**0.67**
CL_1-PCB	13	--	--	ND	ND	ND
CL_2-PCB	13	--	--	ND	ND	ND
CL_3-PCB	11	--	--	ND	0.07	ND
CL_4-PCB	13	--	--	ND	ND	ND
CL_5-PCB	13	--	--	ND	ND	ND
CL_6-PCB	13	--	--	ND	ND	ND
CL_7-PCB	13	--	--	ND	ND	ND
CL_8-PCB	13	--	--	ND	ND	ND
CL_9-PCB	13	--	--	ND	ND	ND
CL_{10}-PCB	13	--	--	ND	ND	ND
Total PCB	***11***	**--**	**--**	***ND***	***0.07***	***ND***
CL_2-Phenol	0	0.87	0.77	1.03	2.27	0.04
CL_3-Phenol	8	--	--	ND	0.10	ND
CL_4-Phenol	6	0.09	0.10	0.04	0.30	ND
CL_5-Phenol	3	0.46	0.52	0.18	1.66	ND
Total CP	***0***	***1.44***	***1.20***	***1.28***	***3.23***	***0.08***
SAMPLE VOLUME (m^3)		***670***	***414***	***575***	***2019***	***434***

ND = less than detection level of 0.03 ng/m^3 for CB and CP
= less than detection limit of 0.03 to 0.06 ng/m^3 for PCB

TABLE 11 - PROPERTIES of SELECTED AROCLORS (Commercial Mixtures of PCB's)

AROCLOR	VAPORIZATION RATE ($mg/cm^2/h$)	PRINCIPAL COMPONENTS	TOTAL No. of COMPONENTS
1221	1.7	Cl_1	10-25
1242	0.34	Cl_2-Cl_4	27-74
1248	0.15	Cl_3-Cl_5	43-63
1254	0.053	Cl_4-Cl_6	27-116
1260	0.009	Cl_5-Cl_7	35-124
1262	0.013	Cl_6-Cl_8	--

Volatile Organic Compounds (VOC)

Eighty nine different VOC compounds were measured at each site. Most of these were alkane, alkene and aromatic hydrocarbons but beginning in December 1987 eight chlorinated hydrocarbons were also quantified. Concentrations of selected VOC in units of ppbv for 58 sampling days at the Windsor site are contained in *Table 12* and data for 33 sampling days for the Walpole Island site are found in *Table 13*. Summary statistics and daily concentrations for all VOC species measured are contained in Appendix E.

Most concentrations of alkane, alkene and aromatic hydrocarbon species at Windsor were 2 to 3 times higher than concentrations at Walpole Island. Mean total VOC concentrations at Windsor were 328 ppbC (ppb carbon) vs 198 ppbC at Walpole Island. Concentrations of a number of the chlorinated species such as trichlorofluoromethane (Freon 11), chloroform, and carbon tetrachloride at Walpole Island were equal to or greater than concentrations at Windsor. These compounds have very long lifetimes in the atmosphere and are found at almost equal concentrations across the globe.

A number of VOC compounds are suspect or recognized human carcinogens. These compounds include benzene, 1,3-butadiene, dichloromethane, carbon tetrachloride, tricholroethylene and tetrachloroethylene. Benzene in particular has received a great deal of attention in recent years. Mean concentrations of benzene were 1.33 ppb at Windsor and 0.41 ppb at Walpole Island. In *Table 14*, benzene concentrations from other Canadian monitoring sites are compared to the Windsor and Walpole data. The State of Michigan annual average environmental acceptability level for benzene is 0.05 ppb.

Inhalable Particulate Matter and Associated Elements and Ions

A total of 40 elements plus sulphate and nitrate were determined for the fine (<2.5 µm) and coarse (2.5 µm to 10 µm) fraction of inhalable particulate matter collected with a dichotomous sampler. Results for all elements and ions for each sampling day for Windsor and Walpole Island are contained in *Appendix F*.

Table 15 contains summary statistics for inhalable particulate (fine plus coarse fractions) mass, sulphate, nitrate and selected elements for 67 sampling days at the Windsor site. Inhalable particulate concentrations and sulphate concentrations were high on some of the summer sampling days. Of the metallic elements measured, zinc and iron were found in the highest concentrations. Mean concentrations of some other metals were 0.068 µg/m^3 for lead, 0.007 µg/m^3 for chromium and 0.033 µg/m^3 for manganese.

Table 16 contains inhalable particulate summary statistics for 23 sampling days at the Walpole Island site. Concentrations of most elements were a factor of 3 to 5 times lower than those measured at Windsor. Total inhalable particulate concentrations and sulphate concentrations, however, were similar to those measured at Windsor during the summer months.

All values at both sites were well below existing Ontario provincial air quality criteria for metallic elements. A large historical database for many metallic elements is available for Windsor and other urban centres in Ontario.

TABLE 12 - CONCENTRATIONS (ppbv) of SELECTED VOC - WINDSOR (JULY 87 - SEPT. 88 - 58 SAMPLING DAYS)

COMPOUNDS	No. of SAMPLES	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
1,3-Butadiene	58	0.22	0.25	0.16	1.74	ND
Hexane	58	0.99	0.59	0.79	3.11	0.37
Benzene	58	1.33	0.62	1.22	2.76	0.50
Toluene	57	4.29	2.67	3.63	14.83	1.05
Ethylbenzene	58	0.53	0.33	0.39	1.38	0.13
m,p-Xylene	58	1.91	1.39	1.39	6.71	0.29
Styrene	57	0.52	0.51	0.35	2.96	0.02
o-Xylene	56	0.65	0.41	0.51	1.93	0.07
1,3,5-Trimethylbenzene	58	0.50	1.25	0.23	8.19	0.02
1,2,4-Trimethylbenzene	58	1.15	0.67	0.91	2.96	0.03
1,2,3-Trimethylbenzene	58	0.31	0.29	0.21	1.26	ND
p-Cymene	58	0.63	0.58	0.41	2.62	ND
Trichlorofluoromethane	39	0.27	0.07	0.25	0.47	0.17
Dichloromethane	39	1.53	0.96	0.89	5.66	0.56
Chloroform	39	0.11	0.21	0.05	1.06	0.02
1,1,1-Trichloroethane	39	0.51	0.34	0.43	1.92	0.29
Carbon tetrachloride	39	0.22	0.11	0.19	0.55	0.10
Trichloroethylene	58	0.49	0.53	0.20	2.36	0.02
Tetrachloroethylene	58	0.47	0.81	0.25	5.51	0.06
1,4-Dichlorobenzene	39	1.79	0.83	0.80	3.91	0.20

ND = less than detection level of 0.01 to 0.10 ppb

TABLE 13 - CONCENTRATIONS (ppbv) of SELECTED VOC
WALPOLE ISLAND
(JANUARY - SEPTEMBER 88 - 33 SAMPLING DAYS)

COMPOUNDS	NO. of SAMPLES	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
1,3-Butadiene	33	0.06	0.10	0.03	0.47	ND
Hexane	33	3.16	8.05	0.56	44.01	0.08
Benzene	33	0.41	0.22	0.37	1.25	0.18
Toluene	33	1.32	1.11	0.87	4.77	0.22
Ethylbenzene	33	0.15	0.12	0.13	0.51	ND
m,p-Xylene	33	0.70	0.52	0.55	2.25	0.15
Styrene	33	0.02	0.04	ND	0.16	ND
o-Xylene	32	0.30	0.33	0.18	1.47	0.06
1,3,5-Trimethylbenzene	33	0.07	0.06	0.05	0.26	ND
1,2,4-Trimethylbenzene	33	0.91	0.45	0.81	2.12	0.15
1,2,3-Trimethylbenzene	33	0.90	1.24	0.14	3.87	ND
p-Cymene	33	0.53	2.00	0.11	11.55	ND
Trichlorofluoromethane	33	0.56	0.23	0.48	1.40	0.30
Dichloromethane	33	0.60	0.75	0.42	4.26	ND
Chloroform	33	0.16	0.23	0.09	0.94	0.03
1,1,1-Trichloroethane	33	0.32	0.16	0.29	0.77	0.13
Carbon tetrachloride	33	0.53	0.93	0.32	5.58	0.10
Trichloroethylene	33	0.18	0.18	0.11	0.93	0.03
Tetrachloroethylene	33	0.13	0.25	0.07	1.46	0.03
1,4-Dichlorobenzene	33	0.54	0.62	0.38	2.88	ND

ND = less than detection level of 0.01 to 0.10 ppb

TABLE 14 - COMPARISON of BENZENE CONCENTRATIONS (ppbv) at CANADIAN MONITORING SITES

LOCATION	DATES	NO. of SAMPLES	MEAN CONC. (ppbv)
Windsor	July 87 - Sept. 88	58	1.3
Walpole Island	Jan. 88 - Sept. 88	33	0.4
Toronto	Aug. 87 - Oct. 87	9	3.4
Montreal	Aug. 84 - Sept. 86	174	4.5
Vancouver	Dec. 85 - July 86	38	3.2

TABLE 15 - INHALABLE PARTICULATE and INORGANIC COMPOUND CONCENTRATION ($\mu g/m^3$) WINDSOR (July 1987 - September 1988 - 67 Sampling Days)

COMPOUND	NO. < DETECT.	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
Mass	0	36.8	21.9	31.0	102.0	10.0
SO_4	0	6.68	6.42	4.37	29.55	0.69
NO_3	0	1.24	1.42	0.85	9.38	0.04
Vanadium	29	0.008	0.009	0.005	0.031	ND
Chromium	22	0.007	0.007	0.005	0.029	ND
Manganese	0	0.033	0.022	0.026	0.114	0.004
Iron	0	0.729	0.563	0.518	2.477	0.104
Nickel	14	0.003	0.002	0.003	0.010	ND
Copper	16	0.013	0.011	0.010	0.042	ND
Zinc	0	0.138	0.128	0.099	0.645	0.009
Arsenic	27	0.001	0.001	0.001	0.004	ND
Selenium	11	0.003	0.002	0.003	0.007	ND
Bromium	0	0.018	0.014	0.014	0.078	0.003
Cadmium	31	0.003	0.004	0.002	0.017	ND
Lead	0	0.068	0.029	0.063	0.145	0.017

ND = less than detection (see *Table F-1* of *Appendix F*)

TABLE 16 - INHALABLE PARTICULATE and INORGANIC COMPOUND CONCENTRATION ($\mu g/m^3$) WALPOLE ISLAND (January 1988 - September 1988 - 23 Sampling Days)

COMPOUND	NO. < DETECT.	MEAN	STD. DEV.	MEDIAN	MAX.	MIN.
Mass	0	26.5	18.2	23.0	74.0	6.0
SO_4	0	4.67	5.51	3.25	24.89	0.06
NO_3	0	0.56	0.41	0.55	1.47	0.06
Vanadium	18	--	--	ND	0.013	ND
Chromium	20	--	--	ND	0.006	ND
Manganese	3	0.010	0.008	0.009	0.035	ND
Iron	0	0.232	0.217	0.174	0.915	0.003
Nickel	16	--	--	ND	0.010	ND
Copper	8	0.007	0.006	0.005	0.016	ND
Zinc	1	0.028	0.022	0.016	0.090	ND
Arsenic	15	--	--	ND	0.002	ND
Selenium	5	0.001	0.001	0.002	0.004	ND
Bromine	1	0.002	0.002	0.003	0.007	ND
Cadmium	20	--	--	ND	0.003	ND
Lead	0	0.011	0.011	0.014	0.052	0.005

ND = less than detection (see *Table F-1* of *Appendix F*)

Effect of Meteorological Variables on Measured Concentrations

Meteorological data was available from a nearby site in Windsor and from a portable meteorological station installed on Walpole Island. *Figure 3* provides a wind rose for all sampling days between July 1987 and September 1988 at Windsor. *Figure 4* gives a wind rose for sampling days between January 1988 and September 1988 at Walpole Island. Wind speed, wind direction, mean, maximum and minimum temperature data is given for each sampling day at each site in *Appendices G*. For all sampling days at Windsor the mean temperature was 11.0°C, for Walpole Island sampling days the mean temperature was 11.4°C.

Calculated pollution roses (ie. mean concentration by predominant daily wind direction are shown for inhalable particulate mass and total PAH in *Figures 5 to 8*. Also shown are the frequency of predominant winds from each of the 16 wind directions. Because there were relatively few occurrences of days with predominant winds for many of the 16 directions, wind direction data was also combined into four wind quadrants; N to E, E to S, S to W and W to N. Days with winds from one of the four cardinal wind directions (N, E, S and W) were double counted (used in two different quadrant calculations). Results of the wind quadrant analysis for selected compounds are given in *Table 17* for Windsor and *Table 18* for Walpole Island. For the Windsor site, concentrations of many compounds were highest with winds from the E to S or S to W quadrants. Mean total PCDD and PCDF concentrations were highest with winds from the N to E quadrant, although a limited data set makes interpretation of this result difficult. At Walpole Island, there was less evidence of a wind direction influence on concentration levels for most compounds. Winds from the N to E quadrant tended to result in the lowest measured concentrations for most compounds.

In *Table 19*, a summary of mean concentrations of selected compounds or compound category totals is shown by season for the Windsor site. The same analysis was not carried out for Walpole Island since a full year of data has not been collected. As shown in *Table 11*, different compound categories exhibit totally different behaviour in regards to seasonal patterns. PCDD/PCDF and benzo(a)-pyrene concentrations were highest in the winter whereas PCB, CP and many of the volatile organics were found in higher concentrations in the summer.

A number of compounds, in particular PCB and CP, showed a relationship to temperature. In general, a compound's vaporization rate is directly related to its vapor pressure which is in turn related to temperature through the general equation:

Equation 1

$$\log_{10} P = -A/T + C$$

where:

P	=	vapor pressure
A & C	=	constants (vary by compound)
T	=	temperature (°K)

Compounds that are found in the atmosphere predominantly due to evaporation should have a concentration that is related to temperature as shown in *Equation 1*. In *Figure 9* concentrations of PCB at Windsor are plotted vs ambient temperature; a linear relationship is evident. In *Figure 10* CP concentrations for both Windsor and Walpole Island are plotted and in *Figure 11* CB concentrations for the two sites are plotted. It appears that evaporation is the major route of emission of CP's and PCB's to the atmosphere; CB's show no relationship to temperature and evaporation is unlikely to be a major source.

FIGURE 3 - WIND ROSE for SAMPLING DAYS at WALPOLE (45 days)

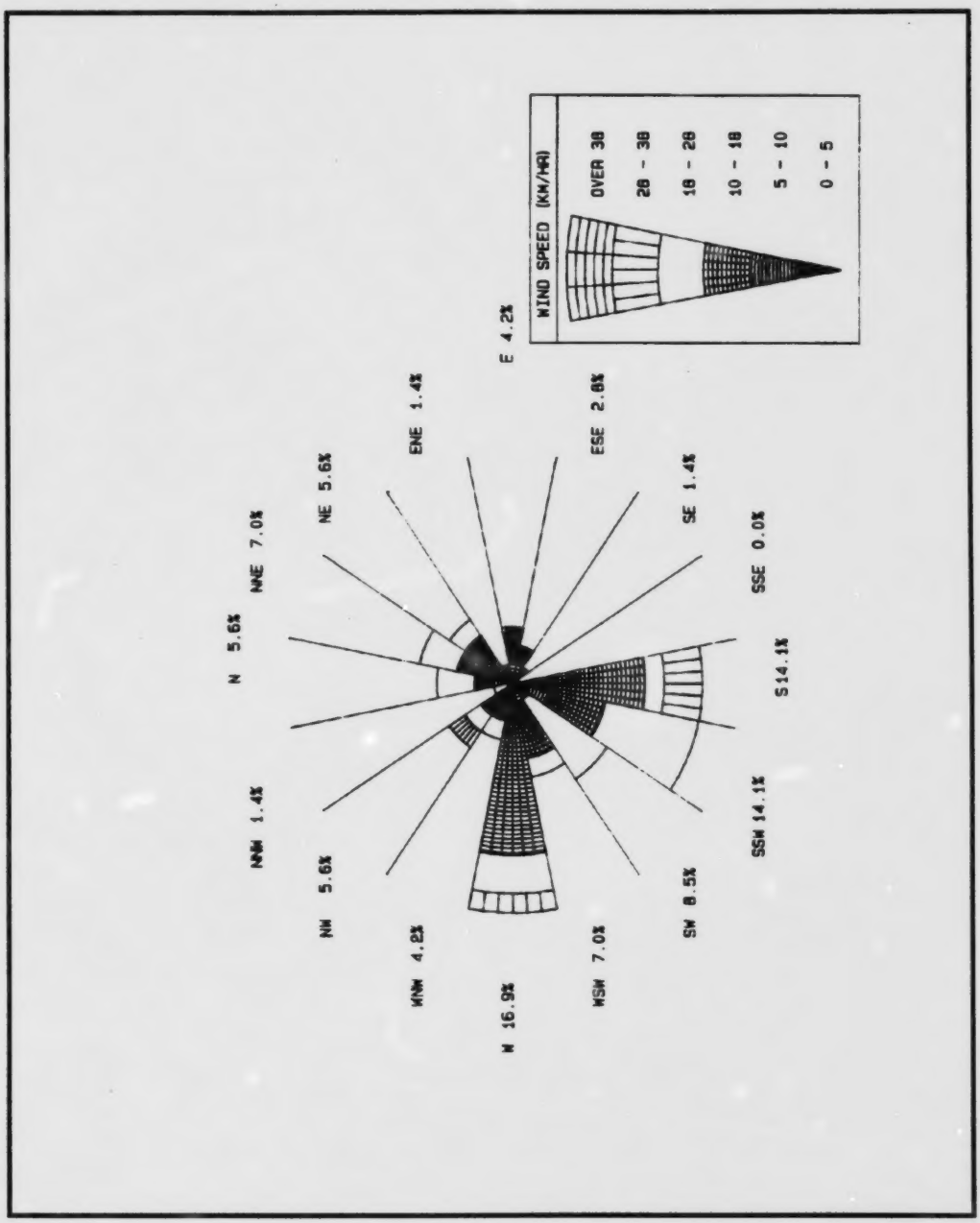


FIGURE 4 - WIND ROSE for SAMPLING DAYS at WALPOLE (45 days)

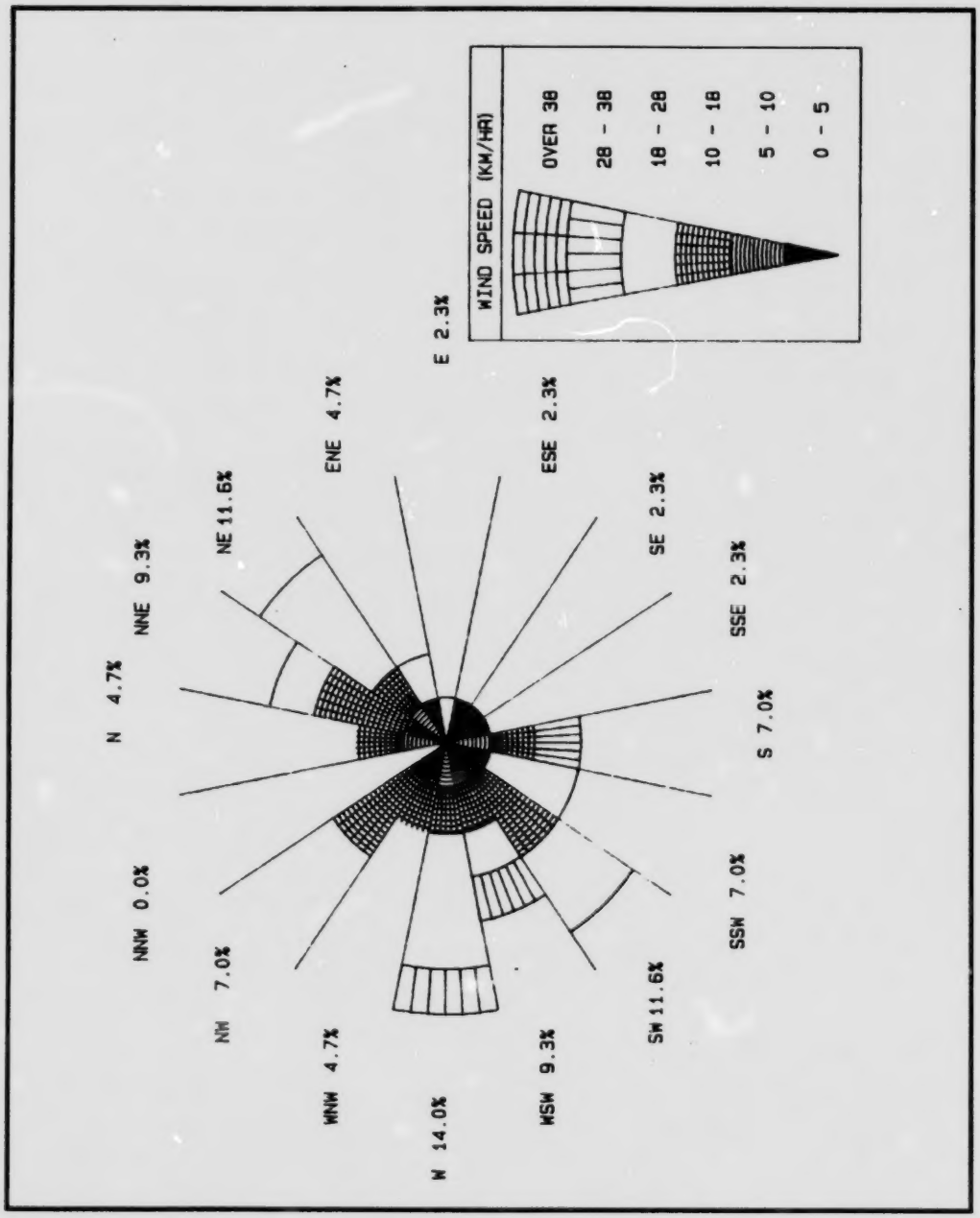
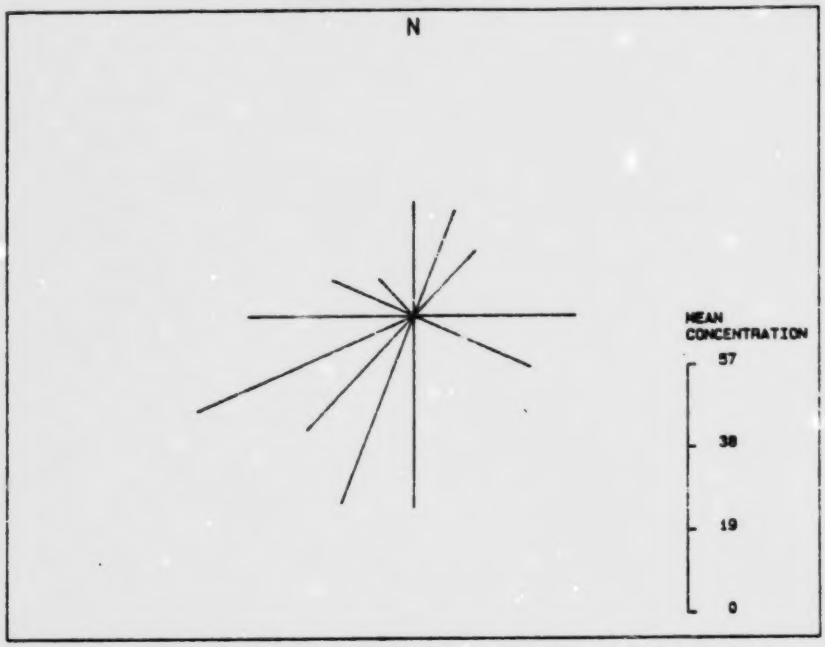
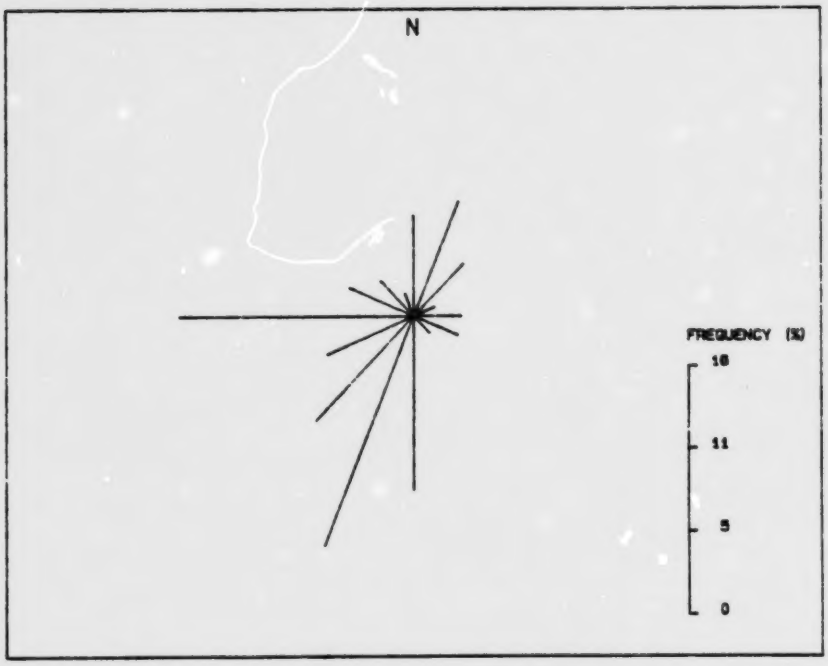


FIGURE 5 - MEAN CONCENTRATION of INHALABLE PARTICULATE MASS ($\mu g/m^3$) by WIND DIRECTION - WINDSOR

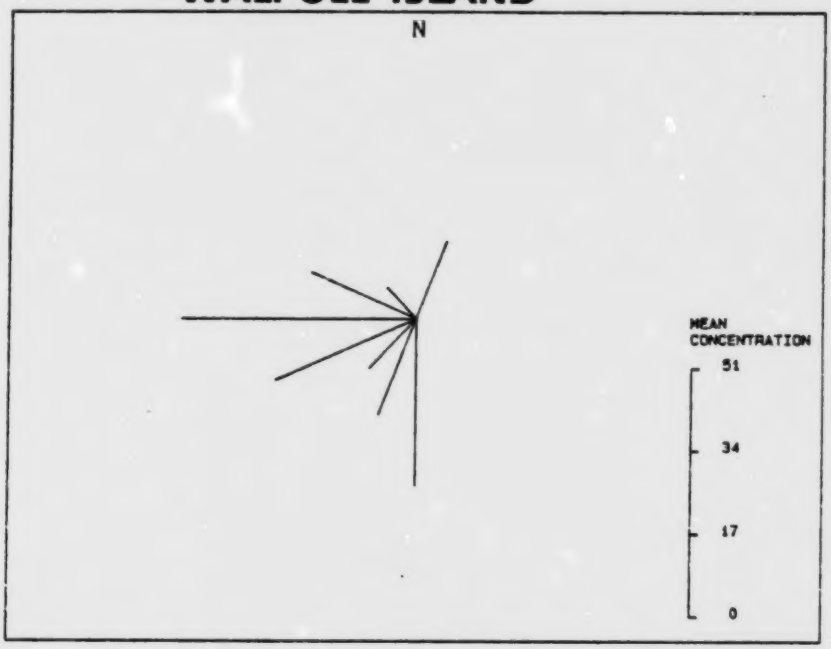


MEAN CONCENTRATION BY WIND DIRECTION

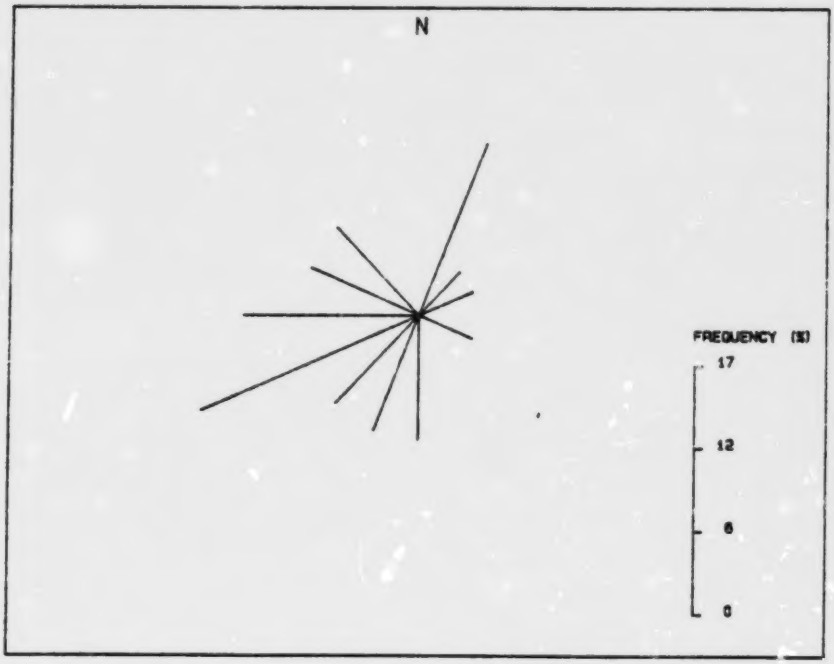


FREQUENCY OF WIND FROM SPECIFIED DIRECTIONS

FIGURE 6 - MEAN CONCENTRATION of INHALABLE PARTICULATE MASS ($\mu g/m^3$) by WIND DIRECTION - WALPOLE ISLAND

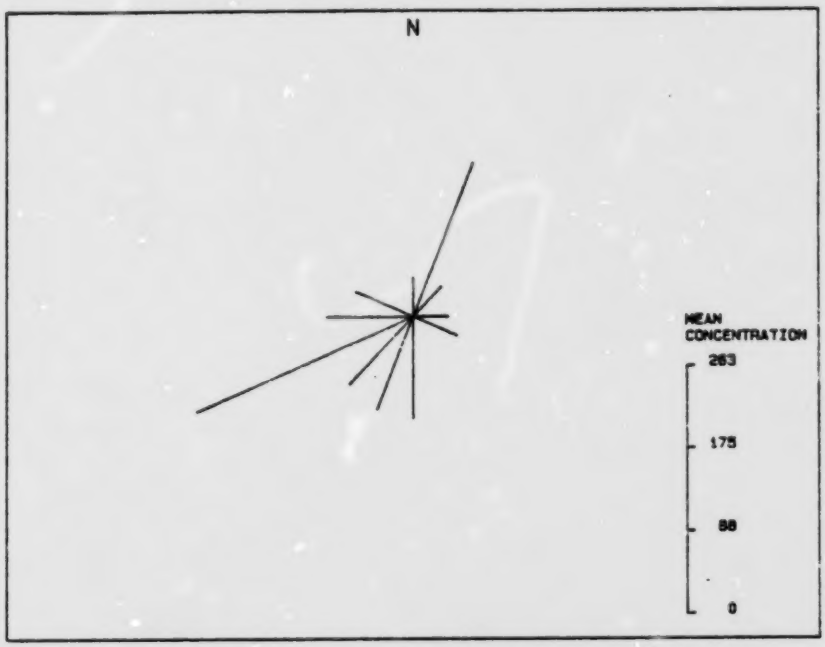


MEAN CONCENTRATION BY WIND DIRECTION

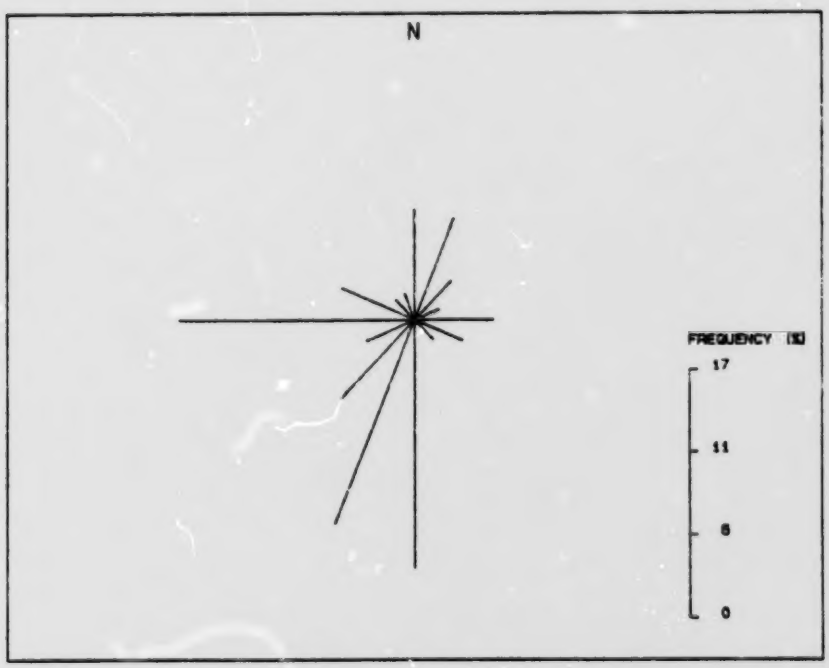


FREQUENCY OF WIND FROM SPECIFIED DIRECTIONS

FIGURE 7 - MEAN CONCENTRATION of TOTAL PAH (ng/m^3) by WIND DIRECTION - WINDSOR

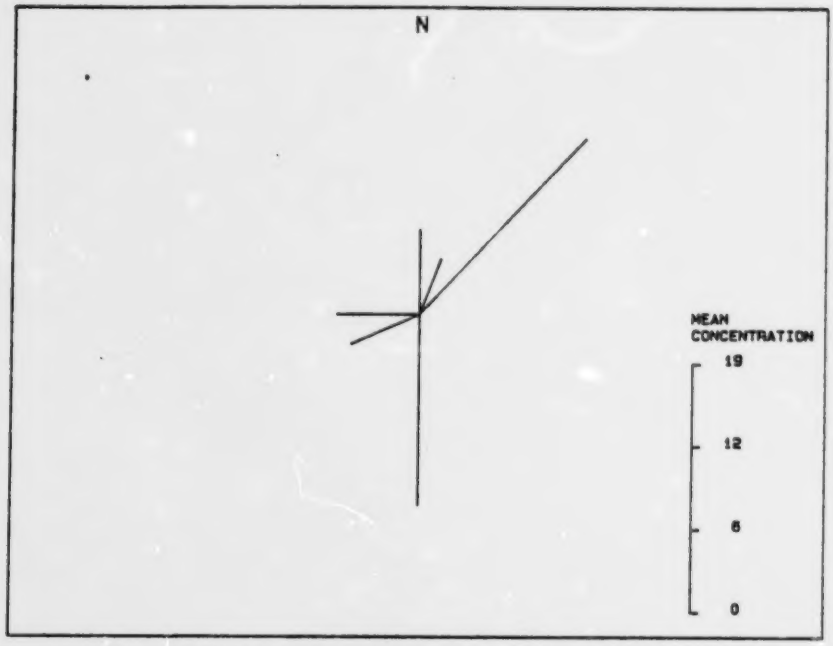


MEAN CONCENTRATION BY WIND DIRECTION

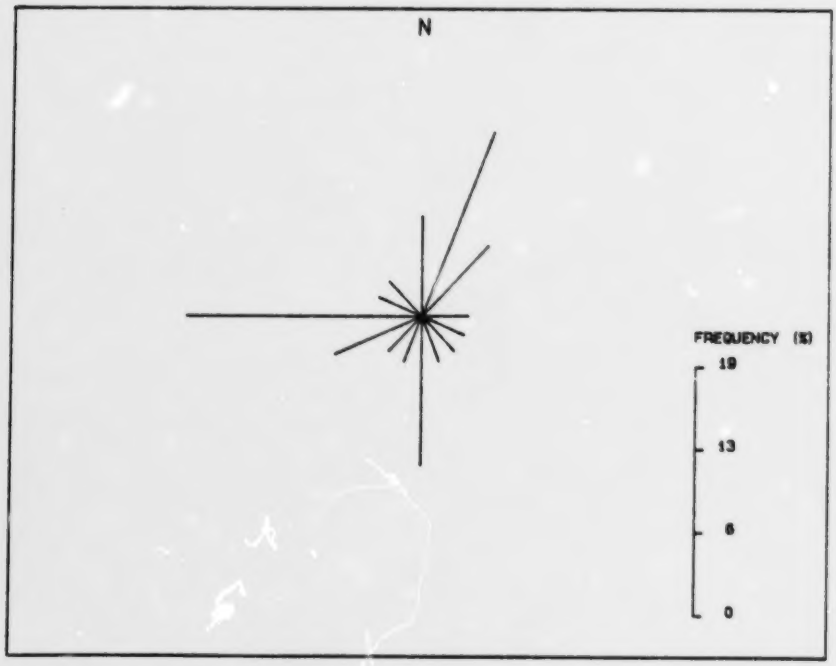


FREQUENCY OF WIND FROM SPECIFIED DIRECTIONS

FIGURE 8 - MEAN CONCENTRATION of TOTAL PAH (ng/m^3) by WIND DIRECTION - WALPOLE ISLAND



MEAN CONCENTRATION BY WIND DIRECTION



FREQUENCY OF WIND FROM SPECIFIED DIRECTIONS

FIGURE 9 - RELATIONSHIP between PCB and TEMPERATURE - WINDSOR

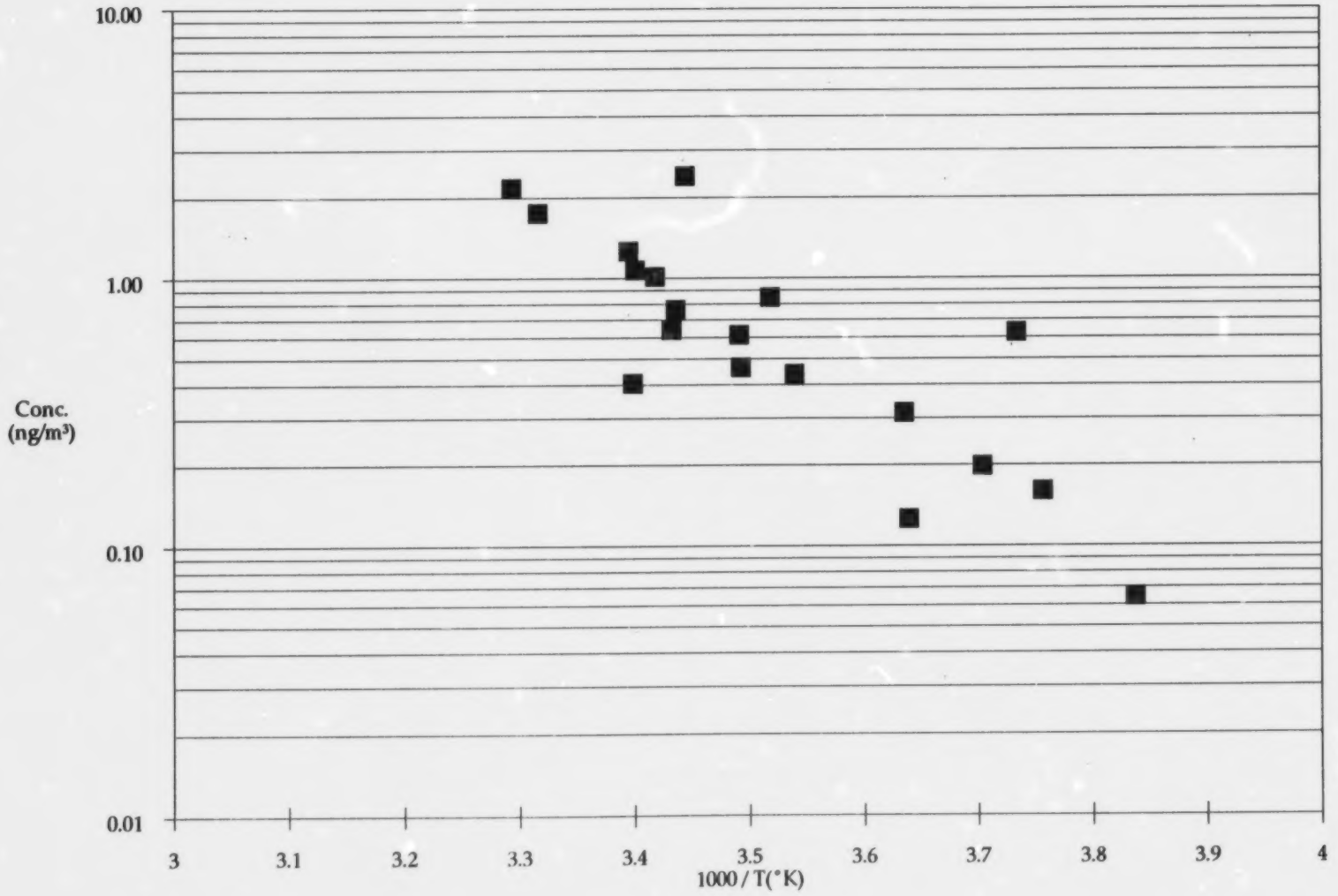


FIGURE 10 - RELATIONSHIP between CP and TEMPERATURE WINDSOR and WALPOLE

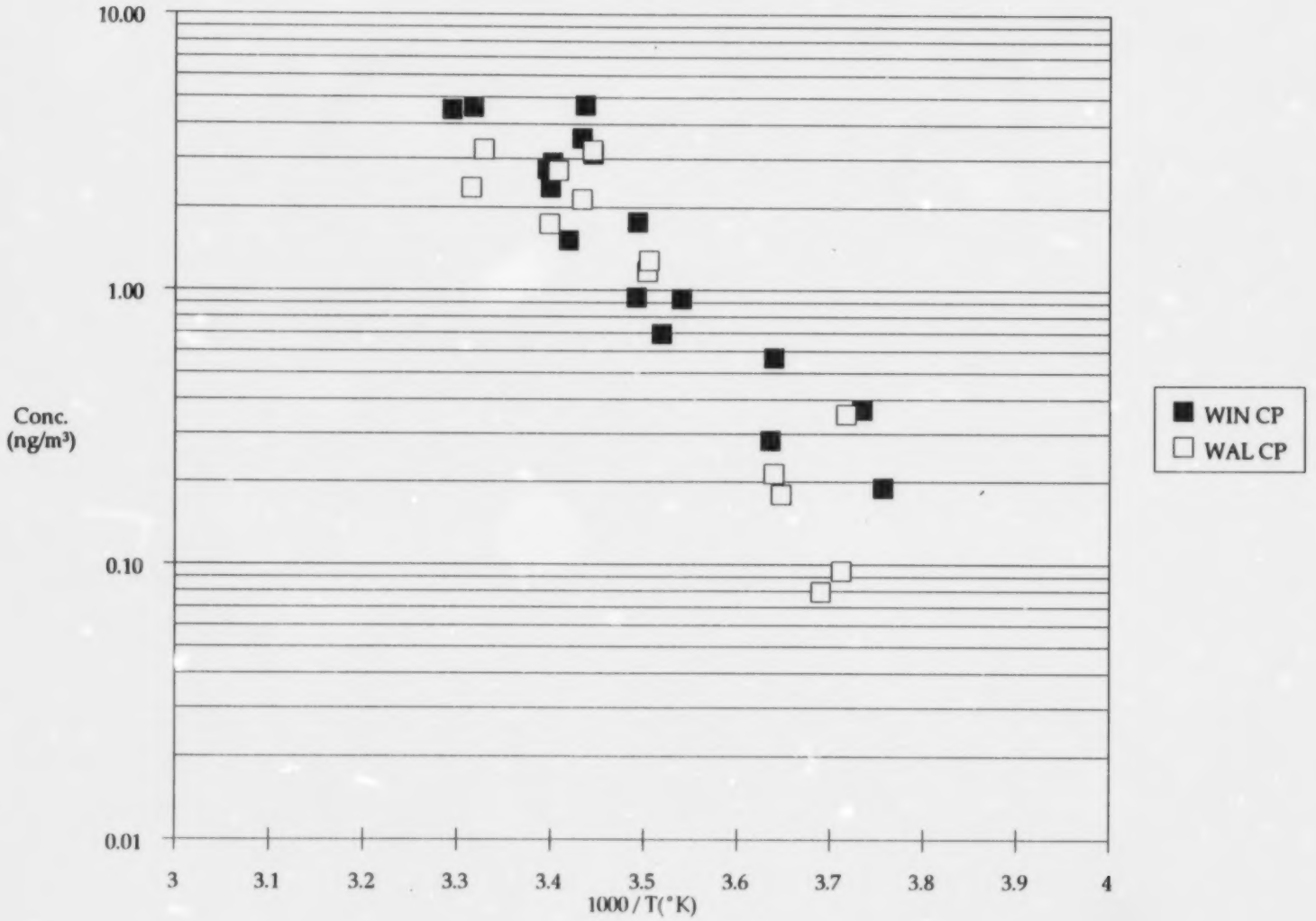


FIGURE 11 - RELATIONSHIP between CB and TEMPERATURE WINDSOR and WALPOLE

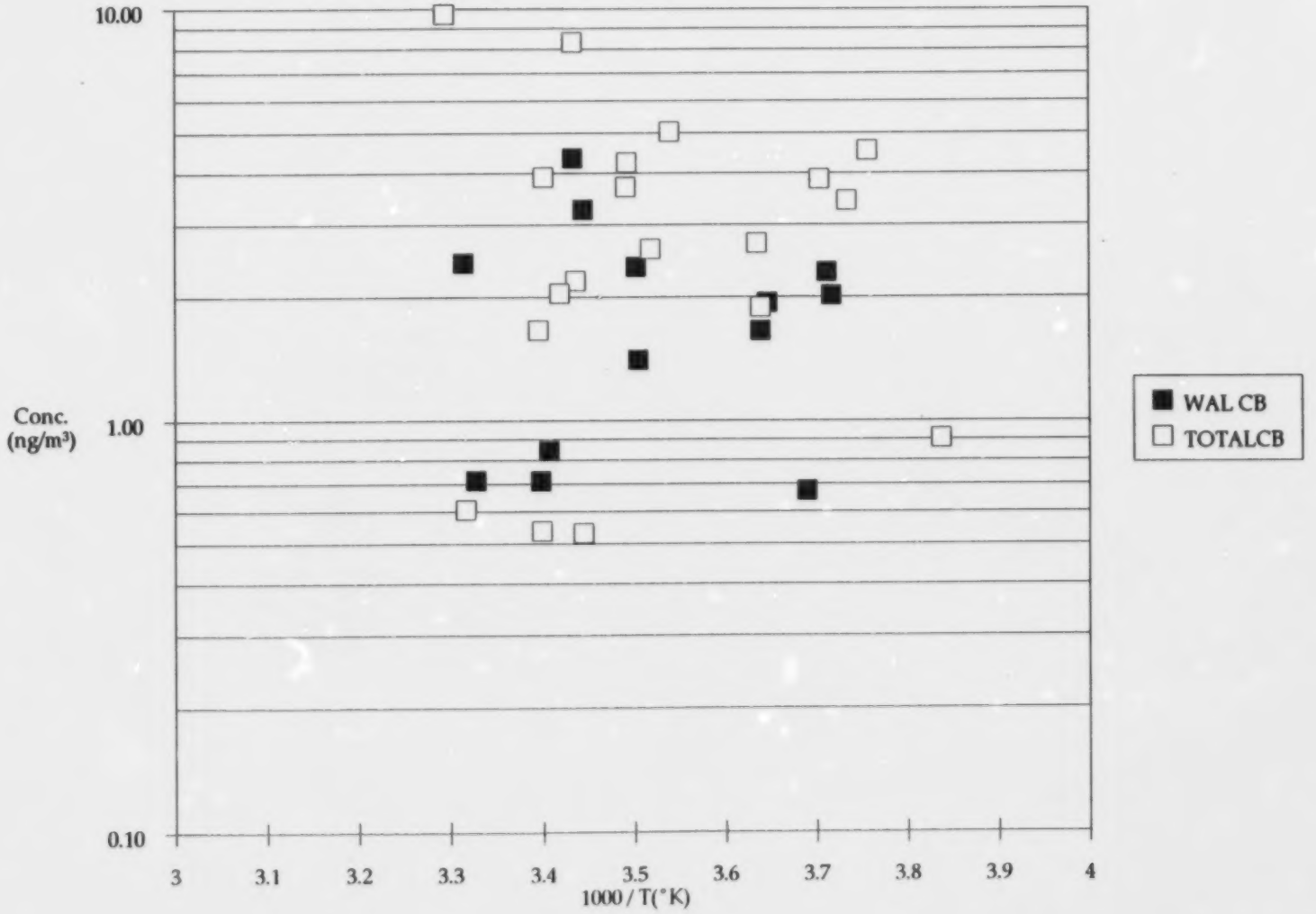


TABLE 17 - MEAN CONCENTRATIONS of SELECTED COMPOUNDS or COMPOUND CATEGORY TOTALS by WIND QUADRANT - WINDSOR (JULY 1987 - SEPT. 1988)

Compound	N → E		E → S		S → W		W → N	
	N	Mean	N	Mean	N	Mean	N	Mean
Total PAH (ng/m3)	14	55.40	15	82.90	32	113.47	18	73.96
Phenanthrene (ng/m3)	14	22.65	15	32.13	32	41.86	18	27.92
Benzo(a)Pyrene (ng/m3)	14	0.29	15	0.52	32	0.84	18	0.40
Total PCDD (pg/m3)	3	3.80	3	1.65	8	1.60	6	1.53
Total PCDF (pg/m3)	3	0.56	3	0.19	8	0.37	6	0.40
Total PCB (ng/m3)	6	0.80	5	0.68	11	0.75	7	0.63
Total CB (ng/m3)	6	3.16	5	4.59	11	3.61	7	3.61
Total CP (ng/m3)	6	1.14	5	1.99	11	2.23	7	1.35
Benzene (ppb)	12	0.80	11	1.18	38	1.46	18	1.27
Toluene (ppb)	12	2.66	11	4.11	38	4.75	18	4.34
Dichloromethane (ppb)	12	1.38	5	1.22	24	1.49	11	1.52
Trichloroethylene (ppb)	12	0.26	11	0.73	38	0.50	18	0.57
IP (µg/m3)	15	26.40	12	40.33	37	43.57	20	30.55
SO_4 (µg/m3)	15	3.95	12	8.47	37	8.35	20	4.85
Fe (µg/m3)	15	0.445	12	0.713	37	0.933	20	0.506
Zn (µg/m3)	15	0.088	12	0.126	37	0.181	20	0.090
Mn (µg/m3)	15	0.023	12	0.031	37	0.041	20	0.025

TABLE 18 - MEAN CONCENTRATIONS of SELECTED COMPOUNDS or COMPOUND CATEGORY TOTALS by WIND QUADRANT - WALPOLE ISLAND (JAN. 1988 - SEPT. 1988)

Compound	N → E		E → S		S → W		W → N	
	N	Mean	N	Mean	N	Mean	N	Mean
Total PAH (ng/m3)	9	7.99	7	9.16	12	8.55	9	7.08
Phenanthrene (ng/m3)	9	3.21	7	3.76	12	3.82	9	3.11
Benzo(a)Pyrene (ng/m3)	9	0.04	7	0.07	12	0.07	9	0.07
Total PCDD (pg/m3)	1	0.11	3	0.53	6	0.50	2	ND
Total PCDF (pg/m3)	1	ND	3	0.04	6	0.02	2	ND
Total PCB (ng/m3)	5	ND	6	0.01	6	0.01	2	0.04
Total CB (ng/m3)	5	1.11	6	2.35	6	2.45	2	2.04
Total CP (ng/m3)	5	1.20	6	1.90	6	1.87	2	1.28
Benzene (ppb)	7	0.37	4	0.38	17	0.46	9	0.36
Toluene (ppb)	7	0.57	4	2.17	17	1.62	9	1.22
Dichloromethane (ppb)	7	0.36	4	0.25	17	0.72	9	0.40
Trichloroethylene (ppb)	7	0.07	4	0.29	17	0.21	9	0.08
IP (µg/m3)	4	16.50	3	31.33	13	32.92	7	31.71
SO_4 (µg/m3)	4	1.78	3	5.48	13	6.55	7	7.13
Fe (µg/m3)	4	0.093	3	0.352	13	0.308	7	0.270
Zn (µg/m3)	4	0.010	3	0.022	13	0.034	7	0.039
Mn (µg/m3)	4	0.004	3	0.012	13	0.013	7	0.011

TABLE 19 - MEAN CONCENTRATIONS of SELECTED COMPOUNDS or COMPOUND CATEGORY TOTALS by SEASON - WINDSOR (JULY 1987 - SEPT. 1988)

Compound	WINTER		SPRING		SUMMER		FALL	
	N	Mean	N	Mean	N	Mean	N	Mean
Total PAH (ng/m^3)	10	97.52	13	82.07	18	76.12	14	106.55
Phenanthrene (ng/m^3)	10	27.87	13	33.54	18	36.39	14	33.79
Benzo(a)Pyrene (ng/m^3)	10	0.99	13	0.41	18	0.49	14	0.67
Total PCDD (pg/m^3)	2	5.19	3	0.67	4	1.59	3	2.45
Total PCDF (pg/m^3)	2	0.78	3	0.04	4	0.50	3	0.37
Total PCB (ng/m^3)	4	0.26	5	0.46	6	1.28	4	1.07
Total CB (ng/m^3)	4	3.18	5	3.86	6	3.08	4	2.97
Total CP (ng/m^3)	4	0.14	5	2.17	6	3.10	4	1.42
Benzene (ppb)	9	1.01	10	0.91	23	1.50	14	1.42
Toluene (ppb)	9	3.28	10	2.57	23	5.49	14	3.84
Dichloromethane (ppb)	8	2.36	10	1.13	16	1.18	4	1.23
Trichloroethylene (ppb)	9	0.17	10	0.20	23	0.60	14	0.65
IP ($\mu g/m^3$)	14	30.21	12	31.42	22	46.86	14	29.93
SO_4 ($\mu g/m^3$)	14	4.14	12	5.14	22	9.70	14	5.54
Fe ($\mu g/m^3$)	14	0.561	12	0.616	22	0.833	14	0.729
Zn ($\mu g/m^3$)	14	0.121	12	0.121	22	0.165	14	0.128
Mn ($\mu g/m^3$)	14	0.026	12	0.030	22	0.037	14	0.032

Quality Assurance

Quality assurance results in terms of field blank concentrations and surrogate recoveries are contained in the Appendices for each compound category. On 5 sampling days in Windsor and on 6 days at Walpole Island, duplicate PAH concentration data were collected using simultaneously operated hi-vols, one equipped with PUF adsorbent and the other equipped with PUF/XAD adsorbent The results of this duplicate sampling is provided in *Tables C 5 and C 6 of Appendix C.* The mean absolute percent difference between duplicate samples ranged from 20 to 70%; the absolute mean difference between total PAH concentrations was 17%. On days with temperature greater than 5°C, the PUF/XAD sampler typically recorded values of acenapthylenes, acenapthene and fluorene 3 to 5 times higher than measured with PUF alone confirming the poor PUF collection efficiency for these compounds.

Many VOC samples were analyzed in duplicate, summaries of percent differences by compound category are shown for both Windsor and Walpole Island in *Appendix E.* Median absolute percent differences for duplicate analyses for most compounds were less than 10%.

In August 1988, an intercomparison study was carried out between Environment Canada (EC) and Roy F. Weston Ltd. who operate a similar toxics monitoring effort in Detroit on behalf of the GDRRA. Co-located sampling was carried out in Detroit and Windsor for PCDD/PCDF, PAH and PCB. A summary of percentage differences between the two agencies for the compounds measured is given in *Tables 20, 21 and 22.* Percentage differences were calculated using the formula :

% Diff. = (EC-Weston)/((EC + Weston)/2)*100%

The PAH and PCB results were within an order of magnitude of each other. Only 16 of the 26 EC PAH species were reported by Weston. On the PCDD/PCDF sampling day in Windsor, Weston did not detect any PCDD/PCDF; most of the EC results were below the calculated Weston detection levels. For the Detroit PCDD/PCDF sample, both agencies found relatively high levels of PCDD/PCDF, however, the Weston concentrations were an order of magnitude or more higher than the EC results. The PCDD/PCDF results were recovery corrected. Mean recoveries for labelled surrogates for the EC sample at Detroit were in the 80 to 120% range. Weston recoveries for this sample were 27% for octa dioxin and 66% for tetra dioxins.

Some methodological variations between the agencies include differences in sample flow rates in filter and PUF sizes, in sample holding times, in extraction procedures, in clean up procedures and possibly in analytical and calculation differences.[10] It should be noted that few, if any, inter-agency comparisons have ever been carried out for these compounds and it is difficult to determine an *"acceptable"* difference in reported concentrations. An absolute percent difference of 100% or less could be considered reasonable for samples with concentrations greater than 10 times the detection levels. Absolute percent differences would be expected to get larger as concentrations approach detection levels.[11]

TABLE 20 - PCDD / PCDF RESULTS (pg/m^3)
WINDSOR / DETROIT
EC - WESTON INTERCOMPARISON

Compound	DETROIT - Aug. 24,1988			WINDSOR - Sept. 18, 1988		
	EC	Weston	% Diff.	EC	Weston	% Diff.
T_4CDD	<0.11	<0.06	--	0.03	<0.48	--
P_5CDD	<0.18	<0.06	--	<0.08	<0.48	--
H_6CDD	2.22	0.27	157	0.16	<0.72	--
H_7CDD	2.99	9.48	-104	0.34	<0.42	--
O_8CDD	2.49	44.08	-179	0.71	<0.38	--
Total PCDD	***7.69***	***53.83***	***-150***	***1.24***	--	--
T_4CDF	3.40	<.08	--	0.41	<0.72	--
P_5CDF	2.50	0.35	151	0.12	<0.56	--
H_6CDF	2.66	4.27	-47	<0.03	<0.36	--
H_7CDF	1.78	97.52	-193	0.09	<0.56	--
O_8CDF	0.77	52.1	-194	0.07	<0.40	--
Total PCDF	***11.10***	***154.24***	***-173%***	***0.69***	--	--

TABLE 21 - PAH RESULTS (ng/m^3) - WINDSOR / DETROIT EC - WESTON INTERCOMPARISON

Parameter	WINDSOR - Aug. 19, 1988			DETROIT - Aug. 18, 1988		
	EC	Weston	% Diff.	EC	Weston	% Diff.
Acenaphthylene	1.96	1.89	4	ND	6.23	--
Acenaphthene	2.03	4.27	-71	0.44	7.50	-178
Fluorene	2.84	5.39	-62	7.73	9.61	-22
Anthracene	1.71	0.54	104	0.06	1.72	-186
Fluoranthene	6.41	3.55	57	24.12	9.92	83
Pyrene	4.04	2.80	36	15.00	7.67	65
Benzo(a)Anthracene	0.68	0.06	167	10.8	0.71	41
Chrysene & Triphenylene	1.15	0.20	141	1.84	1.44	24
Benzo(b)Fluoranthene	2.64	0.10	185	1.83	1.31	33
Benzo(k)Fluoranthene	ND	0.10	--	ND	1.31	--
Benzo(a)Pyrene	0.84	0.03	186	0.49	0.20	85
Indeno(1,2,3-cd)Pyrene	0.79	ND	--	0.63	0.40	44
Dibenzo(a,c) & (a,h)Anthracene	ND	ND	--	ND	0.06	--
Benzo(g,h,i)Perylene	0.69	0.05	173	0.90	1.33	-39
Total PAH	***25.78***	***18.98***	***30%***	***54.11***	***49.41***	***9%***

TABLE 22 - PCB RESULTS (ng/m^3) - WINDSOR / DETROIT EC - WESTON INTERCOMPARISON

Parameter	WINDSOR - Aug. 22, 1988			DETROIT - Aug. 27, 1988		
	EC	Weston	% Diff.	EC	Weston	% Diff.
CL_1-PCB	ND	ND	--	ND	ND	--
CL_2-PCB	ND	ND	--	0.01	ND	--
CL_3-PCB	0.72	0.17	**124**	0.45	0.17	**90**
CL_4-PCB	0.38	0.30	**23**	0.71	0.30	**81**
CL_5-PCB	0.39	0.17	**79**	0.33	0.17	**64**
CL_6-PCB	0.10	0.12	**-15**	0.11	0.12	**-9**
CL_7-PCB	ND	0.02	--	ND	0.02	--
CL_8-PCB	ND	ND	--	ND	ND	--
CL_9-PCB	ND	ND	--	ND	ND	--
CL_{10}-PCB	ND	ND	--	ND	ND	--
Total PCB	1.59	0.77	**69%**	1.61	0.77	**71%**

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9. Bruckmann, P., et al (1988). "The occurrence of chlorinated and other organic trace compounds in urban air". *Chemosphere* **17**(12):2363.

10. Serne, J. (1989). Personal communication.

11. Chiu, C. (1989). Personal communication.

APPENDIX A

Available Sampling Data for Windsor and Walpole Island Sites

TABLE A1 - AVAILABLE DATA for WINDSOR SITE - SAMPLING PROGRAM REPORT #3

(July 1987 to September 1988)

DATE	SEMI-VOLATILE ORGANICS		Volatile Organics Sampler	Dichotomous Sampler
	Sampler #1	Sampler #2		
Monday, July 20	--	--	VOC	Metals
Sunday, July 26	PAH	--	VOC	Metals
Saturday, August 1	PCB/CLP/CLB/PAH	PCDD/PCDF	VOC	Metals
Friday, August 7	PAH	Field Blank	VOC	Metals
Thursday, August 13	PAH	--	VOC	Metals
Wednesday, August 19	--	--	VOC	Metals
Tuesday, August 25	--	--	VOC	Metals
Monday, August 31	--	PCDD/PCDF**	VOC	Metals
Sunday, September 6	PAH	Field Blank	VOC	Metals
Saturday, September 12	PAH	--	--	Metals
Friday, September 18	--	PCB/CLP/CLB/PAH	--	Metals
Thursday, September 24	PAH	--	--	Metals
Wednesday, September 30	--	--	VOC	--
Tuesday, October 6	PAH	Field Blank	VOC	Metals
Monday, October 12	PAH	--	VOC	Metals
Sunday, October 18	--	PCB/CLP/CLB/PAH	VOC	Metals
Saturday, October 24	PAH	--	VOC	--
Friday, October 30	PCB/CLP/CLB/PAH	PCDD	VOC	--
Thursday, November 5	PAH	Field Blank	--	--
Wednesday, November 11	PAH	--	--	--
Tuesday, November 17	PAH	PCB/CLP/CLB/PAH	VOC	Metals
Monday, November 23	PAH	--	VOC	Metals
Sunday, November 29	--	--	VOC	Metals
Saturday, December 5	PAH	Field Blank	VOC	Metals
Friday, December 11	PAH*	--	--	Metals--
Thursday, December 17	--	--	--	Metals

* Sampler ran for 5 days ** 48 h sample ☒ data not yet available

TABLE A1 - AVAILABLE DATA for WINDSOR SITE - SAMPLING PROGRAM REPORT #3

(July 1987 to September 1988)

DATE	SEMI-VOLATILE ORGANICS		Volatile Organics Sampler	Dichotomous Sampler
	Sampler #1	Sampler #2		
Wednesday, December 23	PAH	--	VOC	Metals
Tuesday, December 29	PCB/CLP/CLB/PAH	PCDD	VOC	Metals
1988 Monday, January 4	PAH	--	VOC	Metals
Sunday, January 10	PAH	PCB/CIP/CIB	VOC	Metals
Saturday, January 16	--	Field Blank	VOC	Metals
Friday, January 22	--	--	VOC	Metals
Thursday, January 28	PAH	--	--	Metals
Wednesday, February 3	PCDD/PCDF	PCB/CIP/CIB	--	Metals
Tuesday, February 9	PAH	--	--	Metals
Monday, February 15	--	--	--	--
Sunday, February 21	PAH	--	VOC	Metals
Saturday, February 27	PAH	PAH/PCB/CIP/CIB	VOC	Metals
Friday, March 4	PAH	Field Blank	--	Metals
Thursday, March 10	PAH/PCB/CLP/CLB	PCDD/PCDF	VOC	Metals
Wednesday, March 16	PAH	--	--	Metals
Tuesday, March 22	PAH	--	--	--
Monday, March 28	PAH	--	--	Metals
Sunday, April 3	PAH/PCB/CIP/CIB	--	--	Metals
Saturday, April 9	--	--	VOC	--
Friday, April 15	PCDD/PCDF	PAH/PCB/CIP/CIB	VOC	Metals
Thursday, April 21	PAH	Field Blank	VOC	Metals
Wednesday, April 27	--	PAH	VOC	Metals
Tuesday, May 3	PAH	--	VOC	Metals
Monday, May 9	PCDD/PCDF	PAH/PCB/CIP/CIB	VOC	--
Sunday, May 15	PAH	--	VOC	Metals
Saturday, May 21	PAH/PCB/CIP/CIB	--	VOC	Metals

* Sampler ran for 5 days ** 48 h sample ☒ data not yet available

TABLE A1 - AVAILABLE DATA for WINDSOR SITE - SAMPLING PROGRAM REPORT #3

(July 1987 to September 1988)

DATE	SEMI-VOLATILE ORGANICS		Volatile Organics Sampler	Dichotomous Sampler
	Sampler #1	Sampler #2		
Friday, May 27	--	--	VOC	Metals
Thursday, June 2	PAH	--	VOC	Metals
Wednesday, June 8	PAH	Field Blank	VOC	Metals
Tuesday, June 14	--	PCDD/PCDF	VOC	Metals
Monday, June 20	PAH	--	VOC	Metals
Sunday, June 26	PAH	PAH/PCB/CIP/CIB	VOC	Metals
Saturday, July 2	PAH	--	VOC	Metals
Friday, July 8	PAH/PCB/CIP/CIB	PCDD/PCDF	VOC	Metals
Thursday, July 14	PAH	--	VOC	Metals
Wednesday, July 20	PAH	PAH/PCB/CIP/CIB	VOC	Metals
Tuesday, July 26	PAH	Field Blank	VOC	Metals
Monday, August 1	--	--	VOC	--
Sunday, August 7	PAH	--	VOC	Metals
Saturday, August 13	PAH	PAH/PCB/CIP/CIB	VOC	Metals
Friday, August 19	PAH	--	VOC	Metals
Thursday, August 25	PAH/PCB/CIP/CIB	PCDD/PCDF	VOC	Metals
Wednesday, August 31	PAH	--	VOC	Metals
Tuesday, September 6	--	☒	VOC	Metals
Monday, September 12	PAH	☒	VOC	Metals
Sunday, September 18	☒	PCDD/PCDF**	VOC	Metals
Saturday, September 24	--	--	VOC	Metals

* Sampler ran for 5 days ** 48 h sample ☒ data not yet available

TABLE A2 - AVAILABLE DATA for WALPOLE ISLAND SITE - SAMPLING PROGRAM REPORT #3

(January to September 1988)

DATE	SEMI-VOLATILE ORGANICS		Volatile Organics Sampler	Dichotomous Sampler
	Sampler #1	Sampler #2		
Monday, January 4	--	--	--	--
Sunday, January 10	--	--	--	--
Saturday, January 16	--	--	--	--
Friday, January 22	PAH/PCB/CIP/CIB	PCDD/PCDF	VOC	Metals
Thursday, January 28	--	--	VOC	Metals
Wednesday, February 3	--	--	--	--
Tuesday, February 9	PAH	--	VOC	Metals
Monday, February 15	--	PCDD/PCDF	VOC	Metals
Sunday, February 21	PAH	--	VOC	--
Saturday, February 27	PAH	PAH/PCB/CIP/CIB	VOC	--
Friday, March 4	--	--	--	--
Thursday, March 10	PAH/PCB/CIP/CIB	PCDD/PCDF	VOC	Metals
Wednesday, March 16	PAH	--	--	--
Tuesday, March 22	PAH	PAH/PCB/CIP/CIB	--	--
Monday, March 28	PAH	--	VOC	--
Sunday, April 3	PAH/PCB/CIP/CIB	PCDD/PCDF	--	--
Saturday, April 9	PAH	--	VOC	Metals
Friday, April 15	PAH	PAH/PCB/CIP/CIB	VOC	--
Thursday, April 21	PAH	--	VOC	Metals
Wednesday, April 27	--	--	VOC	Metals
Tuesday, May 3	--	--	VOC	Metals
Monday, May 9	PAH	PAH/PCB/CIP/CIB	VOC	Metals
Sunday, May 15	PAH	--	VOC	--
Saturday, May 21	PAH/PCB/CIP/CIB	PCDD/PCDF	VOC	--
Friday, May 27	PAH	--	VOC	--
Thursday, June 2	PAH	PAH/PCB/CIP/CIB	--	--

☒ data not yet available

TABLE A2 - AVAILABLE DATA for WALPOLE ISLAND SITE - SAMPLING PROGRAM REPORT #3

(January to September 1988)

DATE	SEMI-VOLATILE ORGANICS		Volatile Organics Sampler	Dichotomous Sampler
	Sampler #1	Sampler #2		
Wednesday, June 8	--	--	--	--
Tuesday, June 14	--	--	VOC	Metals
Monday, June 20	PAH	--	--	Metals
Sunday, June 26	PAH	PAH/PCB/CIP/CIB	VOC	--
Saturday, July 2	PAH	--	--	Metals
Friday, July 8	PAH/PCB/CIP/CIB	PCDD/PCDF	--	Metals
Thursday, July 14	PAH	--	--	--
Wednesday, July 20	PAH	PAH/PCB/CIP/CIB	--	Metals
Tuesday, July 26	PAH	Field Blank	VOC	Metals
Monday, August 1	PAH/PCB/CIP/CIB	PCDD/PCDF	VOC	Metals
Sunday, August 7	PAH	--	VOC	--
Saturday, August 13	☒	☒	VOC	Metals
Friday, August 19	☒	--	VOC	Metals
Thursday, August 25	☒	PCDD/PCDF	VOC	Metals
Wednesday, August 31	☒	--	VOC	Metals
Tuesday, September 6	--	☒	VOC	Metals
Monday, September 12	☒	☒	VOC	Metals
Sunday, September 18	☒	☒	VOC	--
Saturday, September 24	☒	--	VOC	--

☒ data not yet available

APPENDIX B

Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans

Sampling

Samples were collected using a custom modified hi-vol sampling system as shown in *Figure B1*. The sampler employed Teflon-coated glass fibre filter media (Emfab TX40HI20WW); the vapor fraction of the sample was collected with a polyurethane foam (PUF) adsorbent trap detailed in Figure 2. Two 7.5 cm x 7.5 cm ID PUF plugs (density 22.4 kg/m^3) were used in the trap.

Until August 1988 the samplers operated for a 24 h sampling period; typical total sample volumes were 800 to 1,000 m^3. Beginning in August 1988, PCDD/PCDF samples were collected over a 48 h period with total sample volumes ranging from 1600 to 2,000 m^3.

Analysis

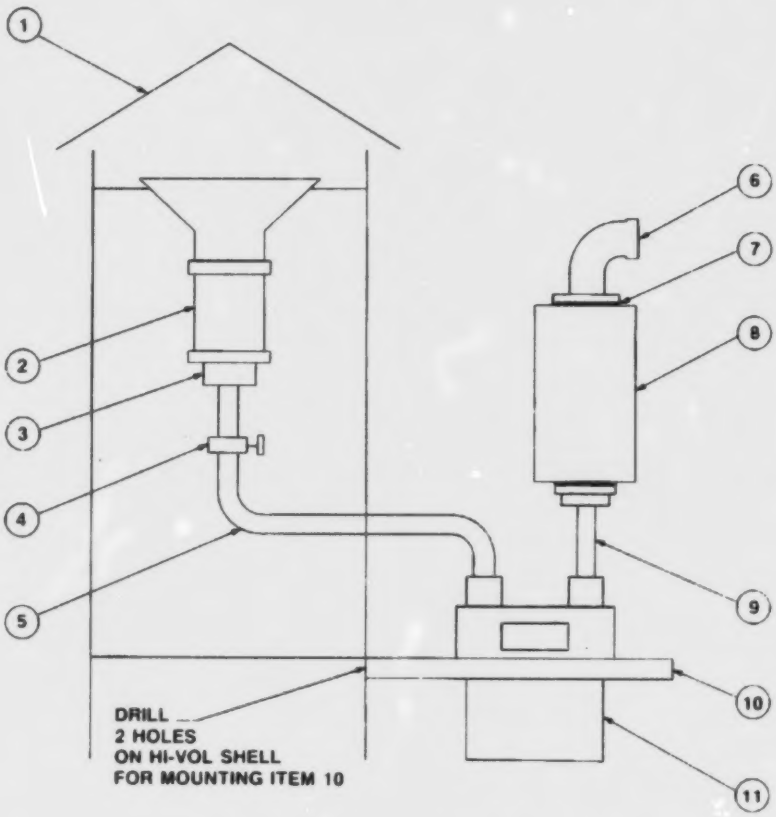
For most samples filter and foam fractions were analyzed separately to allow a determination of the particulate (filter retained) and vapor (polyurethane foam retained) fraction of PCDD and PCDF. For some samples a one part analysis was performed: ie. filter and foam were extracted together. The mean particulate/vapor concentrations are shown in *Table B1*. Table B2 contains mean PCDD/PCDF concentrations for 10 field blanks collected at Windsor. Only one field blank was collected at Walpole Island, PCDD/PCDF concentrations were below detection in this sample.

A detailed description of the analytical methodology is also included in this Appendix. Mean recoveries of the spiked labelled surrogates are given in *Tables B3 and B4*. All concentration values were recovery corrected.

Daily Results

PCDD/PCDF concentrations and surrogate recoveries for each discrete sample are given in Table B4 for Windsor and in Table B5 for Walpole Island.

FIGURE B1 - SAMPLER ASSEMBLY



(1) HI-VOL SAMPLER SHELL WITH CONTROL TIMER AND PRESSURE SENSOR

(2) PUF CANISTER ASSEMBLY DWG NO. 1001

(3) CANISTER ADAPTOR DWG NO. 2001

(4) CONNECTOR DWG NO. 2010

(5) S-PIPE ASSEMBLY

(6) PIPE ELBOW AND FLANGE DWG NO. 2030

(7) RUBBER GASKET DWG NO. 2040

(8) HI-VOL MOTOR HOUSING DWG NO. 2050

(9) MOTOR ADAPTOR DWG NO. 2060

(10) GAS METER SUPPORT BRACKET DWG NO. 2070

(11) GAS METER ROCKWELL MODEL RCM 415

FIGURE B2 - POLYURETHANE FOAM CANISTER ASSEMBLY

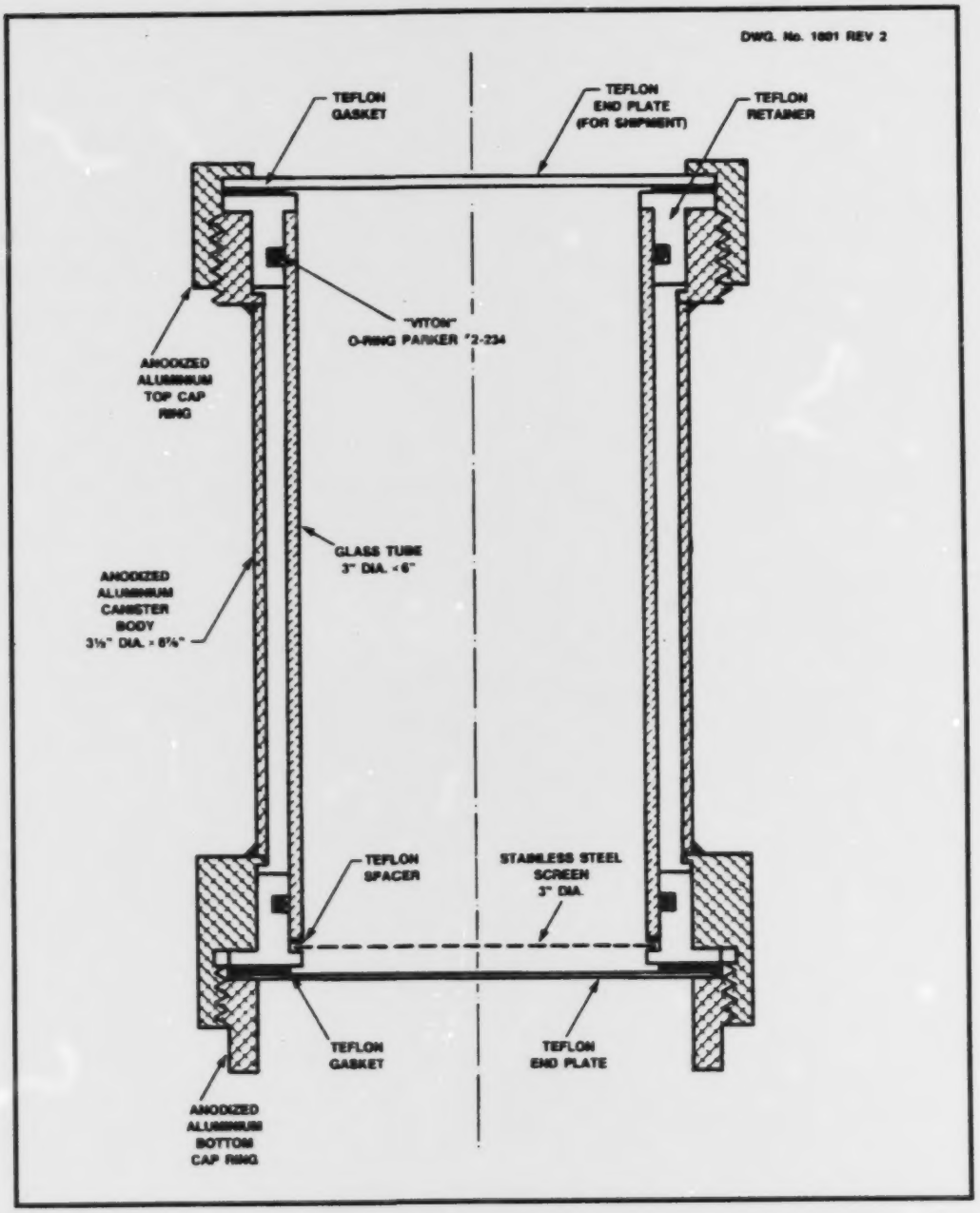

DWG. No. 1601 REV 2
TEFLON GASKET
TEFLON END PLATE (FOR SHIPMENT)
TEFLON RETAINER
"VITON" O-RING PARKER 2-234
ANODIZED ALUMINUM TOP CAP RING
GLASS TUBE 3" DIA. x 6"
ANODIZED ALUMINUM CANISTER BODY 3½" DIA. x 8⅞"
TEFLON SPACER
STAINLESS STEEL SCREEN 3" DIA.
TEFLON GASKET
TEFLON END PLATE
ANODIZED ALUMINUM BOTTOM CAP RING

TABLE B1 - MEAN CONCENTRATIONS (pg/m³) of PCDD / PCDF by PHASE - (Two Part Samples Only)

COMPOUND	WINDSOR n = 12		WALPOLE ISLAND n = 5	
	Particulate	Vapor	Particulate	Vapor
T_4CDD	ND	ND	ND	ND
P_5CDD	ND	0.02	ND	ND
H_6CDD	0.11	0.06	0.02	ND
H_7CDD	0.40	0.09	0.24	ND
OCDD	1.02	ND	0.44	ND
Total PCDD	**1.53**	**0.17**	**0.69**	**ND**
T_4CDF	0.03	0.12	ND	ND
P_5CDF	0.05	0.02	ND	ND
H_6CDF	0.06	ND	ND	ND
H_7CDF	0.06	ND	ND	ND
OCDF	0.06	ND	ND	ND
Total PCDF	**0.08**	**0.14**	**ND**	**ND**

ND = less than Detection
*Means Calculated with ND = 0

TABLE B2 - PCDD / PCDF CONCENTRATIONS (pg/m³) for FIELD BLANKS - WINDSOR (10 days)

COMPOUND	Mean Detect. Level	No. > Detect.	Mean
T_4CDD	0.09	0	ND
P_5CDD	0.23	0	ND
H_6CDD	0.17	0	ND
H_7CDD	0.23	1	0.45
OCDD	0.27	0	ND
Total PCDD		1	0.45
T_4CDF	0.08	0	ND
P_5CDF	0.08	0	ND
H_6CDF	0.12	0	ND
H_7CDF	0.13	0	ND
OCDF	0.24	0	ND
Total PCDF		0	ND

TABLE B3 - RECOVERY of PCDD SURROGATE SPIKES - WINDSOR

COMPOUND	COUNT	MEAN	MAX.	MIN.	STD. DEV.
$^{13}C_{12}$-T_4CDD	25	99	133	63	18.1
$^{13}C_{12}$-P_5CDD	24	104	142	62	19.7
$^{13}C_{12}$-H_6CDD	25	90	125	57	16.4
$^{13}C_{12}$-H_7CDD	25	95	131	54	21.1
$^{13}C_{12}$-OCDD	25	91	122	55	17.0
$^{13}C_{12}$-1234TCDD	25	113	148	81	16.0

TABLE B4 - RECOVERY of PCDD SURROGATE SPIKES - WALPOLE ISLAND

COMPOUND	COUNT	MEAN	MAX.	MIN.	STD. DEV.
$^{13}C_{12}$-T_4CDD	13	90	107	60	14.2
$^{13}C_{12}$-P_5CDD	13	88	103	68	12.8
$^{13}C_{12}$-H_6CDD	13	76	99	36	18.3
$^{13}C_{12}$-H_7CDD	13	95	114	65	14.4
$^{13}C_{12}$-OCDD	13	88	109	60	13.7
$^{13}C_{12}$-1234TCDD	13	103	111	92	7.2

SUMMARY OF ASD'S ANALYTICAL METHOD FOR THE DETERMINATION OF PCDD / PCDF IN AMBIENT AIR

Environment Canada
Conservation & Protection
Analytical Services Division

April 1988

1. SCOPE

The analytical methodology described here is applicable to the determination of polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzo furans (PCDF) in ambient air samples collected by drawing (typically) 800-1000 m^3 of air through a Teflon-coated glass fibre filter followed by a pair of polyurethane foam (PUF) plugs or a PUF / XAD-2 / PUF trap. Method detection limits for a 1000 m^3 sample range from 0.04 pg/m^3 for T_4CDD / T_4CDF isomers to 0.20 pg/m^3 for OCDD/OCDF.

2. ANALYTICAL PROCEDURES

Analytical procedures are schematically illustrated in Figure 1 and are briefly described as follows:

2.1 Extraction

Sample filters and PUF plugs are extracted separately. The filter and top PUF plug are each spiked with a mixture of isotopically-labelled surrogates (2-6 ng per compound). Following a 20 hour soxhlet extraction with toluene, the extract is concentrated by rotary evaporation. Toluene is exchanged for hexane prior to cleanup.

2.2 Cleanup

The concentrated raw extract (3-5 ml) is cleaned up by passage through a series of three columns. Easily oxidized organics are removed on a multi-layered column of acid-coated and base-coated silica. The following silver nitrate/silica column eliminates sulphurous compounds from the raw extract. The third column, packed with activated basic alumina, is eluted with two solvent mixtures of differing polarity to isolate PCDD/PCDF from PCBs and other potential interferents.

If the dioxin fraction is not sufficiently free of interfering co-extractants at this point, a second alumina column cleanup is employed.

Immediately prior to GC/MS analysis, the cleaned sample extract is concentrated just to dryness under a gentle stream of nitrogen. The sample is then re-dissolved in 20 uL of a performance standard solution. Isotopcially-labelled 1,2,3,4 - T_4CDD serves as the performance standard.

2.3 Analysis

A Finnigan 4500 HR GC/LRMS system is used for PCDD / PCDF determination. Operational parameters are as follows:

Column	DB-5, 30 meters x 0.25 mm ID fused silica, 0.25 um film
Injection ...	2 ul, on-column or split/splitless
Oven	100°C for 1 min., 30°/min., to 180°C, 4°/min. to 280°C and hold for 2 min.
Detection Mode	Electron Impact (EI), Multiple Ion Detection (MID)
Dwell Time	100 msec/ion.

Two ions of the molecular cluster and the $(M\text{-}COCl)^+$ daughter ion are monitored for each PCDD / PCDF homologue (Cl_4 to Cl_8). Quantitation of sample PCDD / PCDF is based on daily calibration with an external standard solution. Ion masses selected for identification and quantitation, and the components of the external standard are reported in Table 1.

The presence of PCDD / PCDF in a sample is confirmed when all of the following criteria are satisfied:

- Response for each of the two selected molecular cluster ions must exceed the background noise level by a minimum ratio of 3:1.

- The peak area ratio for these ions must be within ±25% of the rato obtained for the corresponding component of the external standard mixture.

- Peak maxima for all three monitored ions must coincide within one scan unit.

3. QUALITY ASSURANCE

The major elements of the intralaboratory Quality Assurance program are as follows:

- Prior to the processing of actual test samples, all pre-cleaned glassware (including soxhlet apparatus, concentrators, columns, flasks and vials) are rinsed with dichloromethane and hexane. Rinses are combined and processed in the same manner as test samples. If any amount of PCDD/PCDF is detected in the proof rinse, then all glassware is washed again with appropriate solvents and a second proof rinse sample is collected for analysis.

- Prior to soxhlet extraction, each sample is spiked with a mixture of 5 isotopically-labelled surrogates to assess the degree of analyte loss during sample workup.

- An internal standard to monitor instrument and operator performance is added to the sample extract immediately prior to GC/MS analysis. As a condition for acceptance of results for an individual sample analysis, sample response for the performance standard must be within 25% of the response value for this compound in the external standard mixture.

- A standard mixture containing the earliest and latest eluting isomer within each homologous group of PCDD/PCDF is used to correctly define retention time windows for selected ion monitoring of individual homologues.

- Periodically, calibration curves are constructed to verify linearity of response for all homologues over the concentration range of 0.01 to 0.5 ng/uL.

- Sample analyses performed on a given date are bracketed by external standard calibration runs performed on the same date.

- The possibility of test sample contamination due to laboratory processing operations is monitored closely. In addition to blank media analyses routinely incorporated into the design of field sampling programs a method blank sample, consisting of clean sampling media spiked with surrogates, is processed with each batch of 10-12 test samples.

- As a check on accuracy, NBS Reference Material 1614 (2,3,7,8-TCDD in solution) is periodically analyzed as a sample. This aspect of the QA program will be enhanced by the use of other reference materials, as they become available.

- Reported sample results are fully documented in terms of detection limits, surrogate and performance standard recoveries, and number of isomer peaks contributing to reported homologue concentrations. Raw GC/MS data, including calibration data, are archived on tape or disk for potential review at a later date.

4. REFERENCE

Environment Canada Analytical Services Division, RRETC, "Analytical Method for the Determination of PCDD/PCDF in Samples from Municipal Solid Waste Incinerators", March, 1985.

FIGURE 1

WORKUP SCHEMATIC for the DETERMINATION of PCDD/PCDF in AMBIENT AIR SAMPLES

Filter, PUF, XAD

↓

Spike with Surrogates

↓

20 hr. Soxhlet Extraction with Toluene

↓

Concentrate (3 mL)

↓

Solvent Exchange (to Hexane)

↓

Dry over Na_2SO_4

↓

Acid/Base Column

↓

Silver Nitrate Column

↓

Basic Alumina Column

↓

Elute with 2% DCM/Hexane

↓

Elute with 50% DCM/Hexane

↓

Concentrate Last Fraction (100 uL)

↓

GC/ECD Screening

↓

Concentrate to Dryness

↓

Add 20 uL of Performance Standard Solution

↓

GC/MS Analysis

TABLE 1 - QUANTITATION STANDARD and SELECTED ION MASSES for PCDD/PCDF ANALYSIS

COMPOUND	SYSTEMATIC NO	pg/uL	QUANTITATION ION	CONFIRMATION IONS
Dioxins:				
2,3,7,8 T_4CDD	D48	20	322	320,259
1,2,3,7,8 P_5CDD	D54	20	356	354,291
1,2,3,4,7,8 H_6CDD	D66	20	390	392,327
1,2,3,4,6,7,8 H_7CDD	D73	20	424	426,361
OCDD	D75	20	460	458,395
Furans:				
2,3,7,8 T_4CDF	F83	20	306	304,241
1,2,3,7,8 P_5CDF	F94	20	340	338,274
2,3,4,6,7,8 H_6CDF	F130	20	374	376,311
1,2,3,4,6,7,8 H_7CDF	F131	20	408	410,345
OCDF	F134	20	444	442,379
Labelled Surrogates:				
$13C_{12}$ - 2,3,7,8 T_4CDD	D48	100	334	332
$13C_{12}$ - 1,2,3,7,8 P_5CDD	D54	100	368	366
$13C_{12}$ - 1,2,3,6,7,8 H_6CDD	D67	200	402	404
$13C_{12}$ - 1,2,3,4,6,7,8 H_7CDD	D73	200	436	438
$13C_{12}$ - OCDD	D75	300	472	470
Performance Standard:				
$13C_{12}$ - 1,2,3,4 T_4CDD	D27	100	334	332

Note: Systematic number according to Ballschmitter, Chemosphere 1986, 15, 901-915

Table B4: PCDD/PCDF Concentrations (pg/m³) by Sampling Day - Windsor

COMPOUND	1-Aug-87	1-Aug-87	31-Aug-87	31-Aug-87	18-Oct-87	18-Oct-87
T4CDD	< 0.04	< 0.04	< 0.02	< 0.02	< 0 14	< 0.12
P5CDD	< 0.06	0.15	< 0.03	0.04	< 0.18	< 0.17
H6CDD	< 0.10	< 0.10	0.54	< 0.05	< 0.24	0.43
H7CDD	0.18	< 0.10	0.71	< 0.05	0.74	1.07
O8CDD	1.57	< 0.21	0.97	< 0.10	1.36	< 0.44
TOTAL PCDD	1.73	0.15	2.22	0.04	2.10	1.50
T4CDF	< 0.04	0.14	< 0.02	0.18	< 0.10	< 0.08
P5CDF	< 0.04	< 0.04	0.09	0.08	< 0.09	< 0.08
H6CDF	< 0.06	< 0.06	0.13	< 0.03	< 0.17	< 0.17
H7CDF	< 0.06	< 0.06	0.09	< 0.03	< 0.14	< 0.22
O8CDF	< 0.21	< 0.21	0.36	< 0.10	< 0.30	< 0.33
TOTAL PCDF	-	0.14	0.67	0.25	-	-
RECOVERY%						
13CL2-T4CDD	85	99	80	88	75	90
13CL2-P5CDD	120	122	88	85	105	111
13CL2-H6CDD	95	96	81	77	80	80
13CL2-H7CDD	84	105	79	70	97	62
13CL2-OCDD	95	95	77	67	93	84
13CL2-1234TCDD	100	100	100	100	94	111
SAMPLE TYPE	FILTER	PUFS	FILTER	PUFS	FILTER	PUF
SAMPLE VOLUME (m³)	971	971	1931	1931	1036	1036
TSP (μg/m³)	48.4		60.2		50.2	
SAMPLE ID	WW-5	WW-6	WW-14	WW-15	WW-34	WW-35

Table B4: PCDD/PCDF Concentrations (pg/m³) by Sampling Day - Windsor

COMPOUND	30-Oct-87	30-Oct-87	29-Dec-87	29-Dec-87	3-Feb-88	10-Mar-88	10-Mar-88
T4CDD	< 0.04	< 0.03	< 0.02	< 0.03	< 0.06	< 0.05	< 0.06
P5CDD	< 0.06	-	< 0.25	< 0.30	< 0.08	< 0.06	< 0.07
H6CDD	0.22	< 0.08	0.24	< 0.05	1.66	< 0.09	< 0.09
H7CDD	0.69	< 0.06	0.90	< 0.07	2.15	0.15	< 0.10
O8CDD	1.59	< 0.1	2.15	< 0.13	3.29	0.87	< 0.14
TOTAL PCDD	2.50	-	3.29	-	7.09	1.02	-
T4CDF	< 0.31	< 0.04	0.19	< 0.02	0.78	< 0.04	0.12
P5CDF	0.10	< 0.1	0.07	< 0.02	< 0.05	< 0.04	< 0.05
H6CDF	0.11	< 0.04	0.07	< 0.03	0.26	< 0.06	< 0.06
H7CDF	0.11	< 0.06	< 0.05	< 0.10	< 0.08	< 0.06	< 0.06
O8CDF	0.10	< 0.08	0.08	< 0.09	0.13	< 0.09	< 0.09
TOTAL PCDF	0.42	-	0.40	-	1.16	-	0.12
RECOVERY%							
13CL2-T4CDD	99	131	85	94	108	112	98
13CL2-P5CDD	107	142	98		126	132	122
13CL2-H6CDD	104	106	86	74	117	125	116
13CL2-H7CDD	106	99	74	54	125	126	131
13CL2-OCDD	99	79	76	55	122	113	118
13CL2-1234TCDD	109	125	119	119	129	136	117
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER/PUF	FILTER	PUF
SAMPLE VOLUME (m³)	982	982	1000	1000	957	1108	1108
TSP (μg/m³)	94.1		34.2		46.1	56.0	
SAMPLE ID	WW-42	WW-43	WW-68	WW-69	WW-82	WW-99	WW-100

Table B4: PCDD/PCDF Concentrations (pg/m³) by Sampling Day - Windsor

COMPOUND	15-Apr-88	15-Apr-88	9-May-88	9-May-88	8-Jul-88	8-Jul-88
T4CDD	< 0.10	< 0.11	< 0.10	< 0.10	< 0.10	< 0.11
P5CDD	< 0.28	< 0.30	< 0.27	< 0.26	< 0.30	< 0.33
H6CDD	< 0.16	< 0.18	< 0.18	< 0.21	< 0.22	< 0.28
H7CDD	< 0.19	< 0.22	< 0.21	< 0.24	0.38	< 0.24
O8CDD	0.43	< 0.23	0.57	< 0.32	0.90	< 0.32
TOTAL PCDD	0.43	-	0.57	-	1.29	-
T4CDF	< 0.09	< 0.1	< 0.10	< 0.09	< 0.09	0.14
P5CDF	< 0.10	< 0.1	< 0.11	< 0.11	< 0.12	< 0.13
H6CDF	< 0.10	< 0.12	< 0.12	< 0.14	< 0.13	< 0.16
H7CDF	< 0.07	< 0.09	< 0.07	< 0.08	< 0.10	< 0.13
O8CDF	< 0.17	< 0.2	< 0.17	< 0.20	< 0.20	< 0.23
TOTAL PCDF	-	-	-	-	-	0.14
RECOVERY%						
13CL2-T4CDD	68	63	96	101	116	104
13CL2-P5CDD	68	62	83	86	102	90
13CL2-H6CDD	64	57	91	79	93	73
13CL2-H7CDD	75	64	96	84	117	93
13CL2-OCDD	73	63	91	78	108	92
13CL2-1234TCDD	81	85	101	115	116	106
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	816	816	768	768	532	532
TSP (µg/m³)	65.9		118.2		166.0	
SAMPLE ID	WW-111	WW-112	WW-123	WW-124	WW-149	WW-150

Table B4: PCDD/PCDF Concentrations (pg/m³) by Sampling Day - Windsor

COMPOUND	25-Aug-88	25-Aug-88	18-Sep-88	18-Sep-88	12-Oct-88	12-Oct-88
T4CDD	< 0.02	< 0.02	< 0.03	0.03	< 0.03	< 0.02
P5CDD	< 0.05	< 0.05	< 0.08	< 0.08	< 0.07	< 0.07
H6CDD	0.09	< 0.04	0.05	0.10	0.15	0.23
H7CDD	0.34	< 0.04	0.34	< 0.05	0.42	< 0.04
O8CDD	0.49	< 0.05	0.71	< 0.05	0.62	< 0.05
TOTAL PCDD	0.92	-	1.11	0.13	1.19	0.23
T4CDF	0.03	0.31	< 0.03	0.41	0.09	0.10
P5CDF	0.02	0.06	< 0.03	0.12	0.31	< 0.03
H6CDF	0.08	< 0.03	< 0.03	< 0.03	0.30	< 0.03
H7CDF	0.18	< 0.02	0.09	< 0.03	0.19	< 0.02
O8CDF	0.12	< 0.04	0.07	< 0.04	0.19	< 0.04
TOTAL PCDF	0.43	0.37	0.16	0.53	1.09	0.10
RECOVERY%						
13CL2-T4CDD	100	95	117	128	108	133
13CL2-P5CDD	103	93	115	117	106	116
13CL2-H6CDD	99	79	96	99	90	101
13CL2-H7CDD	110	97	115	110	107	106
13CL2-OCDD	102	90	103	105	99	99
13CL2-1234TCDD	111	108	125	135	125	148
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	1689	1689	1723	1723	1966	1966
TSP (μg/m³)	67.7		65.5		35.1	
SAMPLE ID	WW-177	WW-178	WW-187	WW-188	WW-197	WW-198

Table B5: PCDD/PCDF Concentrations (pg/m³) by Sampling Day - Walpole Island

COMPOUNDS	22-Jan-88	22-Jan-88	15-Feb-88	15-Feb-88	10-Mar-88	10-Mar-88	3-Apr-88
T4CDD	< 0.04	< 0.05	< 0.03	< 0.03	< 0.04	< 0.04	< 0.09
P5CDD	< 0.09	< 0.11	< 0.06	< 0.06	< 0.09	< 0.10	< 0.21
H6CDD	0.10	< 0.08	< 0.06	< 0.05	< 0.08	< 0.09	< 0.13
H7CDD	0.40	< 0.10	0.35	< 0.05	0.05	< 0.08	0.38
O8CDD	0.58	< 0.11	0.96	< 0.06	0.06	< 0.10	0.60
TOTAL PCDD	1.08	-	1.30	-	0.11	-	0.98
T4CDF	< 0.03	< 0.04	< 0.02	< 0.02	< 0.03	< 0.03	< 0.08
P5CDF	< 0.04	< 0.05	< 0.03	< 0.02	< 0.04	< 0.04	< 0.07
H6CDF	< 0.04	< 0.05	< 0.04	< 0.03	< 0.05	< 0.05	< 0.08
H7CDF	< 0.06	< 0.07	< 0.04	< 0.03	< 0.05	< 0.06	< 0.07
O8CDF	< 0.08	< 0.09	< 0.05	< 0.05	< 0.07	< 0.08	< 0.16
TOTAL PCDF	-	-	-	-	-	-	-
RECOVERY%							
13CL2-T4CDD	97	83	102	107	89	75	84
13CL2-P5CDD	100	84	98	102	82	68	95
13CL2-H6CDD	99	81	69	90	58	55	84
13CL2-H7CDD	108	88	104	114	96	76	90
13CL2-OCDD	93	90	100	109	93	76	86
13CL2-1234TCDD	108	92	111	111	110	93	98
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF	FILTER
SAMPLE VOLUME (m³)	662	662	1028	1028	854	854	760
TSP (μg/m³)	34.6		19.5		16.0		33.2
SAMPLE ID	WAL-3	WAL-4	WAL-7	WAL-8	WAL-17	WAL-18	WAL-29

Table B5: PCDD/PCDF Concentrations (pg/m³) by Sampling Day - Walpole Island

COMPOUNDS	3-Apr-88	21-May-88	8-Jul-88	8-Jul-88	1-Aug-88	25-Aug-88	25-Aug-88
T4CDD	< 0.13	< 0.09	< 0.08	< 0.08	< 0.08	-	< 0.06
P5CDD	< 0.30	< 0.21	< 0.28	< 0.27	< 0.35	-	< 0.17
H6CDD	< 0.16	< 0.13	< 0.20	< 0.19	< 0.55	-	< 0.10
H7CDD	< 0.23	< 0.18	< 0.18	< 0.19	< 0.21	-	< 0.09
O8CDD	< 0.22	0.29	< 0.26	< 0.26	0.32	-	< 0.20
TOTAL PCDD	-	0.29	-	-	0.32	-	-
T4CDF	< 0.11	0.12	< 0.06	< 0.06	< 0.07	-	< 0.06
P5CDF	< 0.10	< 0.07	< 0.09	< 0.09	< 0.11	-	< 0.07
H6CDF	< 0.11	< 0.09	< 0.12	< 0.11	< 0.32	-	< 0.07
H7CDF	< 0.09	< 0.07	< 0.09	< 0.10	< 0.10	-	< 0.04
O8CDF	< 0.19	< 0.17	< 0.18	< 0.18	< 0.20	-	< 0.17
TOTAL PCDF	-	0.12	-	-	-	-	-
RECOVERY%							
13CL2-T4CDD	60	84	102	106	105	-	82
13CL2-P5CDD	68	91	99	103	85	-	72
13CL2-H6CDD	67	79	93	96	36	-	76
13CL2-H7CDD	65	82	102	97	95	-	113
13CL2-OCDD	69	76	96	96	94	-	60
13CL2-1234TCDD	104	106	99	107	109	-	93
SAMPLE TYPE	PUF	FILTER&PUF	FILTER	PUF	FILTER&PUF	FILTER	PUF
SAMPLE VOLUME (m³)	760	791	703	703	656	670	670
TSP (μg/m³)		91.0	129.1		85.0	-	
SAMPLE ID	WAL-30	WAL-50	WAL-65	WAL-66	WAL-81	*WAL-93	*WAL-94

* Interference Prevented Analysis of Filter

APPENDIX C

Polycyclic Aromatic Hydrocarbons

Sampling

Samples were collected using the same sampling system outlined in Appendix B. On days where samples were also scheduled to be analyzed for chlorinated benzenes, chlorinated phenols and PCB, the adsorbent trap was modified by the addition of a 1.5 cm layer (approx. 40 g) of XAD sorbent *"sandwiched"* between the two PUF plugs. The addition of the XAD reduced total sample volumes to approximately 650 m^3 over 24 h.

Analysis

For most samples, separate analytical determinations were made for the particulate (filter retained) and vapor (adsorbent retained) fractions of PAH. Mean particulate / vapor concentrations are shown in *Table C1* for Windsor and Walpole Island.

Table C2 contains mean blank concentrations for 10 field blanks collected at the Windsor site. Most field blanks were exposed for periods of 5 to 6 days. The PAH compounds detected on the field blanks most likely result from passive deposition to the filter The mean total PAH field blank equalled approximately 1.5% of the mean total PAH level measured during active sampling at the Windsor site. Most compounds were below detection for the majority of samples. Detection levels ranged from 0.01 to 0.05 ng/m^3 depending on compound and on sample volume. A detailed description of the analytical methodology is included in this Appendix. Seven surrogate PAH compounds were used for spiking samples prior to extraction. Recovery results are shown in *Table C3 and C4*. Concentration data was ***not*** recovery corrected.

Duplicate Samples

On a number of sampling days, duplicate PAH samples were collected at both sites using one sampler equipped with PUF adsorbent and another sample equipped with PUF/XAD adsorbent. The results for Windsor are found in Table C5 and for Walpole Island in Table *C6*.

Daily Results

Tables *C7* and *C8* contain PAH concentrations and surrogate recoveries for each discrete sample analyzed at the two sites.

TABLE C1 - MEAN CONCENTRATIONS* (ng/m^3) of PAH by PHASE (Two Part Samples)

COMPOUND	WINDSOR n = 55		WALPOLE n = 26	
	Part.	Vapor	Part.	Vapor
Acenaphthylene	0.01	5.11	ND	0.25
Acenaphthene	0.01	6.25	ND	0.37
Fluorene	0.02	6.81	ND	0.85
2-Methyl-Fluorene	0.05	5.13	ND	0.85
Phenanthrene	0.53	32.97	0.08	3.27
Anthracene	0.09	3.19	ND	0.08
Fluoranthene	1.28	9.27	0.17	0.71
Pyrene	0.96	5.62	0.11	0.34
Benzo(a)Fluorene	0.34	0.80	0.03	0.04
Benzo(b)Fluorene	0.21	0.49	0.01	0.02
1-Me-Pyrene	0.10	0.20	ND	0.01
Benzo(g,h,i)Fluoranthene	0.38	0.28	0.04	0.01
Benzo(a)Anthracene	0.60	0.27	0.04	0.01
Chrysene & Triphenylene	1.29	0.58	0.15	0.03
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND
Benzo(b)Fluoranthene	2.76	0.16	0.32	ND
Benzo(k)Fluoranthene	0.04	ND	ND	ND
Benzo(e)Pyrene	0.75	0.03	0.08	ND
Benzo(a)Pyrene	0.59	0.02	0.06	ND
Perylene	0.09	ND	ND	ND
2-Methyl-Cholanthrene	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.99	ND	0.07	ND
Dibenzo(a,c) & (a,h)Anthracene	0.09	ND	ND	ND
Benzo(b)Chrysene	0.05	ND	ND	ND
Benzo(g,h,i)Perylene	0.74	ND	0.06	ND
Anthanthrene	0.03	ND	ND	ND
TOTAL PAH	***1.96***	***77.20***	***1.23***	***6.83***

ND = less than detection
* Means calculated with ND = 0

TABLE C2 - PAH CONCENTRATIONS (ng/m^3) for FIELD BLANKS WINDSOR (10 Days)

COMPOUND	No. of Samples > Detection	Mean *	Std. Dev.	Median*	Max.	Min.*
Acenaphthylene	2	0.04	--	--	0.04	0.04
Acenaphthene	4	0.04	0.02	0.03	0.08	0.02
Fluorene	7	0.06	0.04	0.05	0.12	0.02
2-Methyl-Fluorene	2	0.21	--	--	0.40	0.02
Phenanthrene	10	0.34	0.28	0.19	1.00	0.10
Anthracene	2	0.05	--	--	0.06	0.04
Fluoranthene	10	0.28	0.21	0.18	0.72	0.07
Pyrene	10	0.17	0.12	0.11	0.39	0.04
Benzo(a)Fluorene	5	0.04	0.02	0.03	0.08	0.02
Benzo(b)Fluorene	1	0.02	--	--	0.02	0.02
1-Me-Pyrene	0	--	--	--	--	--
Benzo(g,h,i)Fluoranthene	3	0.04	0.03	0.02	0.08	0.02
Benzo(a)Anthracene	7	0.05	0.03	0.04	0.09	0.02
Chrysene & Triphenylene	10	0.10	0.05	0.08	0.22	0.04
7-Me-Benzo(a)Anthracene	0	--	--	--	--	--
Benzo(b)Fluoranthene	6	0.17	0.08	0.12	0.31	0.09
Benzo(k)Fluoranthene	2	0.06	--	--	0.08	0.03
Benzo(e)Pyrene	5	0.06	0.02	0.06	0.08	0.03
Benzo(a)Pyrene	5	0.05	0.02	0.06	0.08	0.02
Perylene	0	--	--	--	--	--
2-Methyl-Cholanthrene	0	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	5	0.06	0.02	0.06	0.10	0.04
Dibenzo(a,c) & (a,h)Anthracene	0	--	--	--	--	--
Benzo(b)Chrysene	0	--	--	--	--	--
Benzo(g,h,i)Perylene	4	0.05	0.02	0.04	0.08	0.02
Anthanthrene	1	0.02	--	--	0.02	0.02
TOTAL PAH	***10***	***1.31***	***0.67***	***1.08***	2.29	***0.41***

* For samples > detection level

TABLE C3 - RECOVERIES of PAH SURROGATES WINDSOR

COMPOUND	Count	Mean	Max	Min.	Std. Dev.
d_{10}-Acenaphthene	98	63.6	209	4	46.1
d_{10}-Anthracene	110	68.8	106	4	19.2
d_{10}-Pyrene	110	88.5	119	50	12.1
d_{12}-Benzo(a)Anthracene	110	87.2	129	43	14.3
d_{12}-Benzo(a)Pyrene	110	78.6	130	21	17.1
d_{12}-Dibenzo(a,h)Anthracene	110	84.8	152	41	17.6
d_{12}-Benzo(g,h,i)Perylene	110	83.2	150	42	15.9
Perf. Std.	***110***	***101.1***	***133***	***56***	***11.0***

TABLE C4 - RECOVERIES of PAH SURROGATES WALPOLE ISLAND

COMPOUND	Count	Mean	Max	Min.	Std. Dev.
d_{10}-Acenaphthene	49	40.0	107	2	29.2
d_{10}-Anthracene	52	59.1	85	12	17.3
d_{10}-Pyrene	52	80.6	114	42	13.1
d_{12}-Benzo(a)Anthracene	52	79.5	109	35	13.6
d_{12}-Benzo(a)Pyrene	52	73.7	141	28	19.1
d_{12}-Dibenzo(a,h)Anthracene	52	75.7	109	32	15.3
d_{12}-Benzo(g,h,i)Perylene	52	78.1	115	34	15.4
Perf. Std.	***52***	***97.8***	***142***	***75***	***13.6***

SUMMARY OF ASD'S ANALYTICAL METHOD FOR THE DETERMINATION OF PCB, CB, CP AND PAH IN AMBIENT AIR

Environment Canada
Conservation & Protection
Analytical Services Division

April 1988

1. SCOPE

The analytical methodology described here is applicable to the determination of polychlorinated biphenyls (PCB), chlorinated benzenes (CB), chlorinated phenols (CP), and polyaromatic hydrocarbons (PAH) in ambient air samples collected by drawing (typically) 800-1000 m^3 of air through a Teflon-coated glass fibre filter followed by a pair of polyurethane foam (PUF) plugs or a PUF / XAD-2 / PUF absorbent trap. The limits of detection provided by this method for PCB, CB, CP and PAH range between 40-80, 20-40, 30-60 and 20-50 pg /m^3, respectively, for a 1000 m^3 sample.

2. ANALYTICAL PROCEDURES

Analytical procedures are schematically illustrated in Figures 1 and 2 and are briefly described as follows.

2.1 Extraction

Prior to use, the soxhlet apparatus is blanked with benzene for a minimum of 4 hours. The sample filter and top PUF plug are each spiked with known amounts of isotopically-labelled surrogates from each targeted class of compounds. Sufficient time is allowed for evaporation of the spike mixture solvent, and sample is then soxhlet extracted with benzene for 16 hours. Following rotary evaporation of the raw extract, during which benzene is exchanged for hexane, the extract is dried by passage through sodium sulfate and made up to 10 mL. The raw extract is then split equally, one half for CB/PCB and the other for CP and PAH analysis.

2.2 Cleanup

The CB/PCB portion is subjected to clean up on a series of three columns. An acid / base silica column removes easily oxidized organics. This is followed by a silver nitrate/silica column which eliminates sulphurous compounds from the raw extract. As the final cleanup step, CB/PCB are eluted from an activated basic alumina column with 3% dichloromethane/hexane.

The CP/PAH portion of the raw extract is shaken with a 0.1 M potassium carbonate solution that extracts CP into the aqueous phase. After removing the organic phase, acetic anhydride is added to the aqueous phase and derivatized CP are then extracted back into hexane. The organic phase containing PAH is concentrated to 0.5 mL and cleaned up on a silica gel column. Aliphatics are eluted with hexane and discarded.. PAH are eluted from the column with benzene.

A detailed description of these cleanup procedures can be found in an earlier report [1].

2.3 Analysis

A Hewlett-Packard 5890 / 5970 GC/MSD system is used for sample analysis. Operational parameters are as follows:

Column:	DB-5, 30 meters x 0.25 mm ID fused silica, 0.25 um film.
Injection:	1 uL, on-column.
Oven:	*CB/PCB*: 90°C for 2 min., 15°/M to 180°C, 3°/M to 240°C, 10°/M to 285°C and hold 5 min.
	CP: 90°C for 1 min., 6°/M to 200°C, 35°/M to 290°C and hold 8 min.
	PAH: 90°C for 1 min., 20°/M to 180°C, 5°/M to 280°C and hold 8 min.
Detection Mode:	Electron impact (EI), selected ion monitoring (SIM).
Dwell Time:	50 msec/ion.

A minimum of two characterisitc ions per compound are monitored. Selected ion masses are listed in Table 1, 2 and 3. These tables also specify the compositions of the external standard solutions used for sample quantitation and spike recovery determination.

The presence of a target compound in a cleaned up sample extract is confirmed when all of the following criteria are satisfied:

- Response for each of the two selected molecular cluster ions must exceed the background noise level by a minimum ratio of 3:1.
- The abundance ratio of two major characteristic ions must be within ± 25% of the ratio obtained for the corresponding compound in the external standard solution.
- The peak maxima for the specified characteristic ions must be coincident within 2 scan units (2 seconds maximum).
- For CB, CP and PAH analysis, retention time must be within ± 5 seconds of the retention time for corresponding standard mixture component.

3. QUALITY ASSURANCE

The major elements of the quality assurance program are as follows:

- Prior to soxhlet extraction, each sample is spiked with a mixture of isotopically-labelled surrogates in order to assess the degree of analyte loss during sample workup.
- A performance standard (d_{10}-fluoranthene) is added to the sample extract immediately prior to GC/MS analysis in order to assess the quality of the analysis in terms of run to run consistency of instrument and operator performance.
- An external standard solution consisting of target compounds, surrogates and the performance standard is run before and after each batch of 5-6 samples.
- Five point calibration curves are constructed for selected compounds from each class of target analyte prior to the commencement of sample analysis in order to demonstrate linearity of response over the concentration range from 0.05 to 5.0 ng/uL.
- In addition to field blank samples, a method blank, consisting of sample media (or solvent) spiked with surrogates, is processed with each batch of 10-12 test samples.
- Periodically, control samples consisting of blank sample media spiked with multi-component mixtures of native and surrogate analytes from all classes of target compounds are processed and analyzed as routine samples. Overall method performance for individual compounds within each target class is indicated by recoveries achieved.
- Prior to PCB analysis, a detection window for each of the 10 PCB homologues (mono to deca) is defined by analysis of a "Window Defining" mixture containing the earliest and the latest eluting isomers within each homologous group.

4. REFERENCE

Environment Canada Analytical Services Division, RRETC, "Methodology for Organic Analysis - NITEP/Quebec Combustion Tests", September, 1987.

FIGURE 1

EXTRACTION SCHEMATIC for AMBIENT AIR SAMPLES

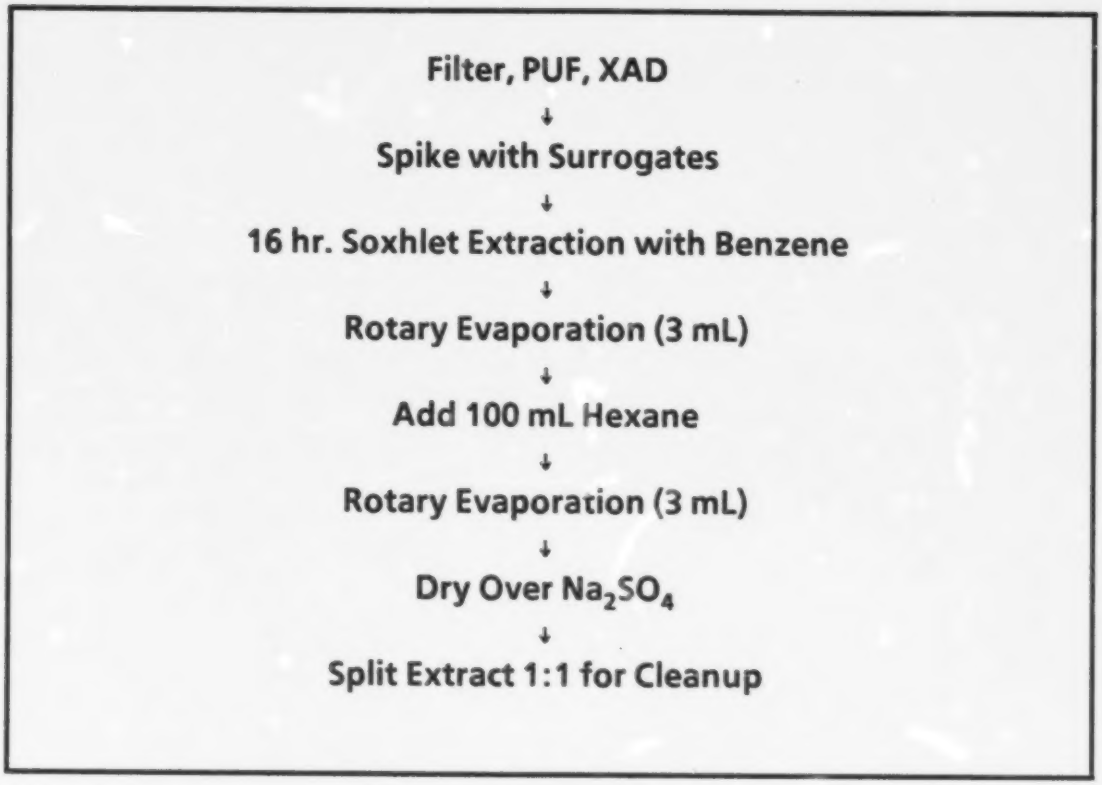


FIGURE 2-1

CLEANUP SCHEMATIC for CB and PCB ANALYSIS

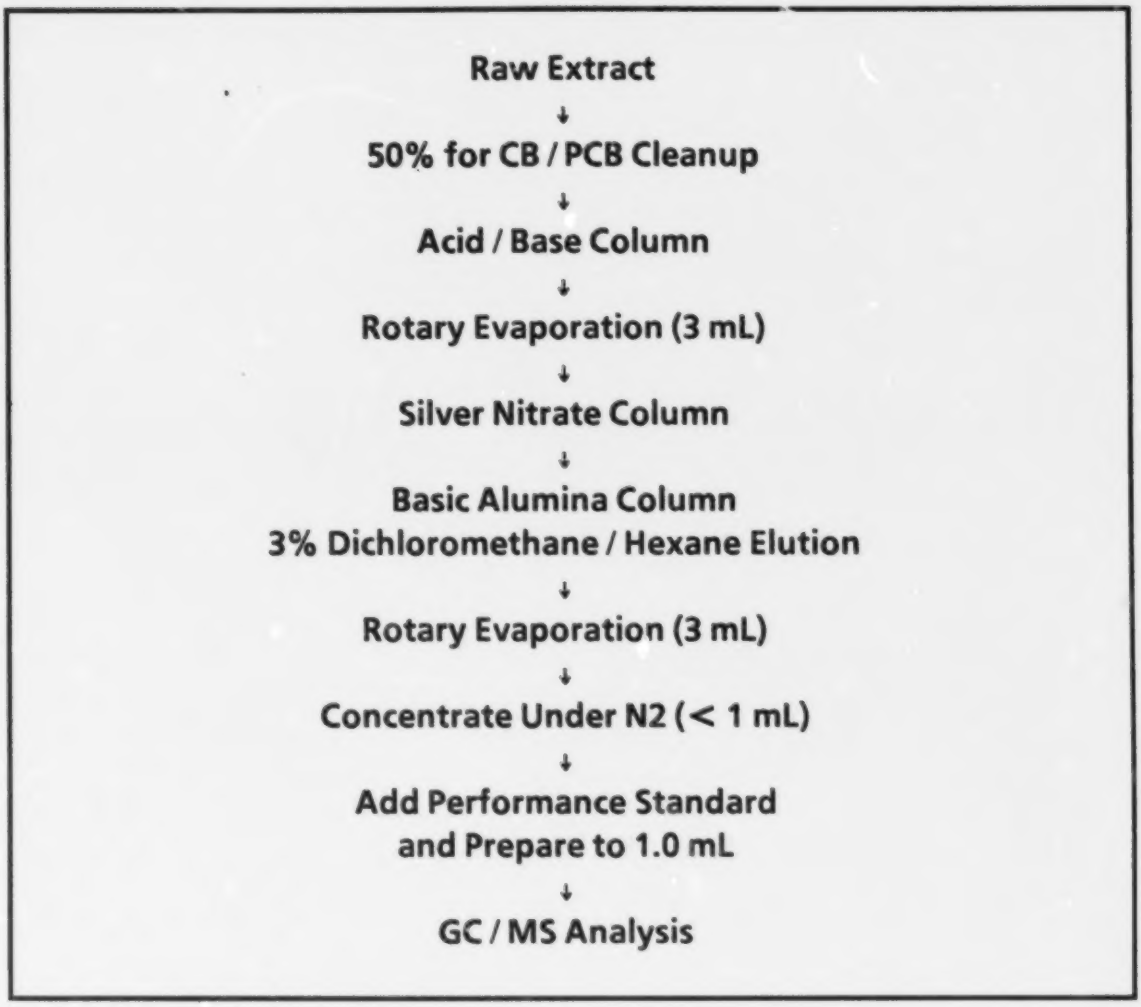


FIGURE 2-2

CLEANUP SCHEMATIC for CP and PAH ANALYSIS

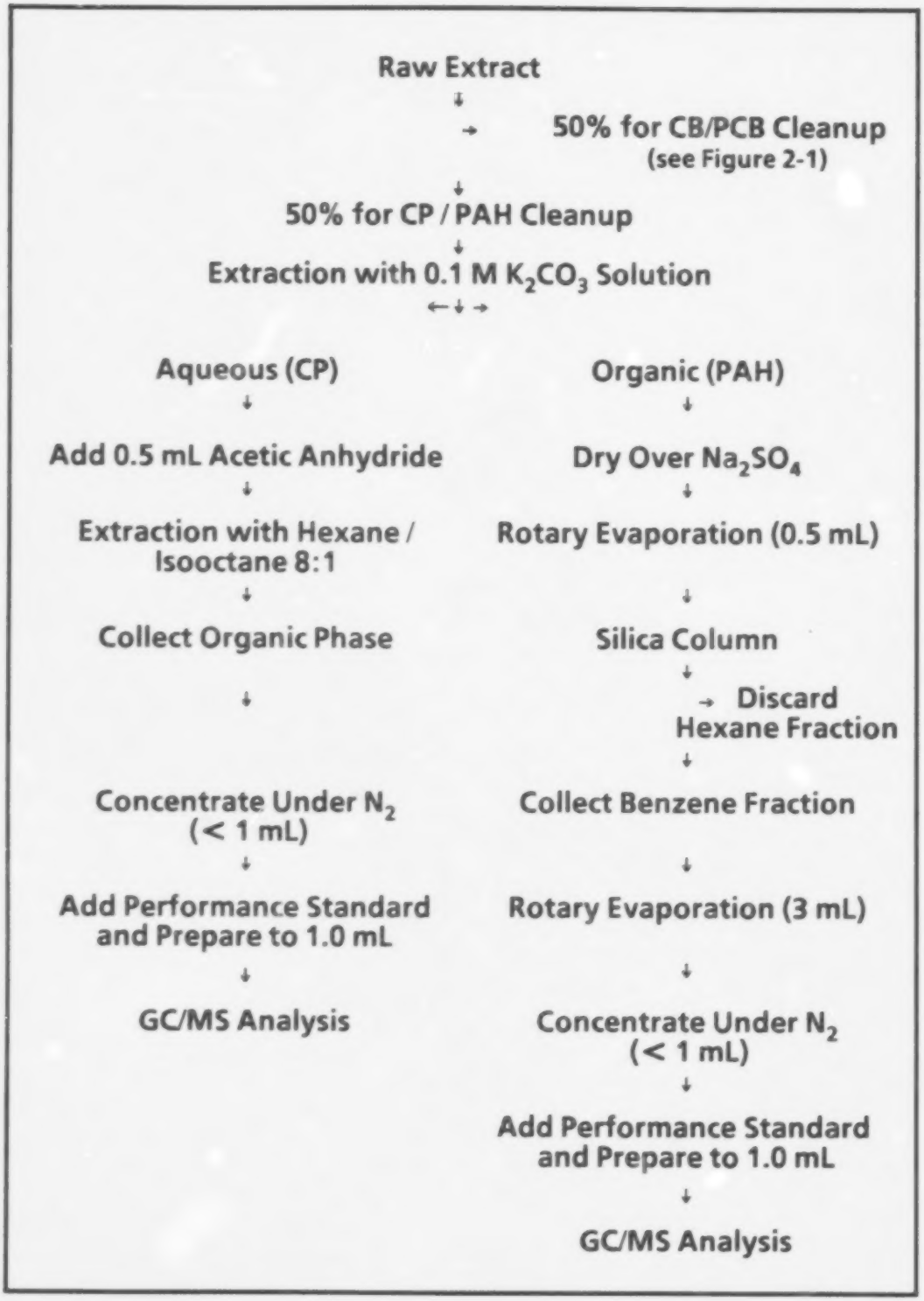

Raw Extract
50% for CB/PCB Cleanup
(see Figure 2-1)
50% for CP / PAH Cleanup
Extraction with 0.1 M K_2CO_3 Solution
Aqueous (CP)
Add 0.5 mL Acetic Anhydride
Extraction with Hexane / Isooctane 8:1
Collect Organic Phase
Concentrate Under N_2 (< 1 mL)
Add Performance Standard and Prepare to 1.0 mL
GC/MS Analysis
Organic (PAH)
Dry Over Na_2SO_4
Rotary Evaporation (0.5 mL)
Silica Column
Discard Hexane Fraction
Collect Benzene Fraction
Rotary Evaporation (3 mL)
Concentrate Under N_2 (< 1 mL)
Add Performance Standard and Prepare to 1.0 mL
GC/MS Analysis

TABLE 1

QUANTITATION STANDARD and MONITORED IONS for CB / PCB ANALYSIS

COMPOUND	CONCENTRATION ng / uL	QUANTITATION ION	CONFIRMATION IONS
Chlorobenzenes:			
1,2,4 Trichloro	1	180	182
1,3,5 Trichloro	1	180	182
1,2,3 Trichloro	1	180	182
1,2,3,4 Tetrachloro	1	216	214
1,2,3,5 Tetrachloro	1	216	214
1,2,4,5 Tetrachloro	1	216	214
Pentachloro	1	250	248
Hexachloro	1	284	286
PCB:			
2 Monochloro	1	188	190
4 Monochloro	1	188	190
2,4 Dichloro	1	222	224
2,4,6 Trichloro	1	258	256, 188
2,2',4,6 Tetrachloro	1	292	290, 222
2,2',3',4,5 Pentachloro	1	326	324, 256
2,2',3,4,5,6' Hexachloro	1	360	358, 290
2,2',3,4,4',5',6 Heptachloro	1	394	396, 324
2,2',3,3',5,5',6,6' Octachloro	1	430	428, 358
2,2',3,3',4,4',5,6,6' Nonachloro	1	464	462, 394
Decachloro	1	498	500, 428
Labelled Surrogates:			
$^{13}C_6$ - 1,2,4,5 Tetrachlorobenzene	1	222	
$^{13}C_6$ - Hexachlorobenzene	1	292	
$^{13}C_{12}$ - Pentachlorobiphenyl	0.4	338	
$^{13}C_{12}$ - Octachlorobiphenyl	0.4	442	
Performance Standard:			
d_{10} - Fluoranthene	1	212	

TABLE 2

QUANTITATION STANDARD and MONITORED IONS for CP ANALYSIS

COMPOUND	CONCENTRATION ng / uL	QUANTITATION ION	CONFIRMATION IONS
2,3 Dichlorophenol	1	162	164, 204
2,4 Dichlorophenol	1	162	164, 204
2,5 Dichlorophenol	1	162	164, 204
2,6 Dichlorophenol	1	162	164, 204
3,4 Dichlorophenol	1	162	164, 204
3,5 Dichlorophenol	1	162	164, 204
2,3,4 Trichlorophenol	1	196	198, 238
2,3,5 Trichlorophenol	1	196	198, 238
2,3,6 Trichlorophenol	1	196	198, 238
2,4,5Trichlorophenol	1	196	198, 238
2,4,6 Trichlorophenol	1	196	198, 238
3,4,5 Trichlorophenol	1	196	198, 238
2,3,4,5 Tetrachlorophenol	1	232	230, 274
2,3,4,6 Tetrachlorophenol	1	232	230, 274
2,3,5,6 Tetrachlorophenol	1	232	230, 274
Pentachlorophenol	1	266	264, 308
Labelled Surrogates:			
$^{13}C_6$ - 3,4 Dichlorophenol	1	168	
$^{13}C_6$ - 2,4,5 Trichlorophenol	1	202	
$^{13}C_6$ - Pentachlorophenol	1	274	
Performance Standard:			
d_{10} - Fluoranthene	1	212	

TABLE 3

QUANTITATION STANDARD and MONITORED IONS for PAH ANALYSIS

COMPOUNDS	ABBREV.	QUANTITATION ION	CONFIRMATION IONS	CONCENTRATION ng/uL
Acenaphthylene	AL	152	151, 153	1
Acenaphthene	AE	153	152, 151	1
Fluorene	FL	166	165, 163	1
2 Me-Fluorene	MFL	165	178, 179	1
Phenanthrene	PHE	178	176, 179	1
Anthracene	AN	178	176, 179	1
Fluoranthene	FLT	202	200, 101	1
Pyrene	PY	202	200, 101	1
Benzo(a)Fluorene	B(a)FL	216	215, 108	1
Benzo(b)Fluorene	B(b)FL	216	215, 108	1
1 Me-Pyrene	MPY	216	215, 108	1
Benzo(g,h,i)Fluoranthene	B(ghi)F	226	224, 113	1
Benzo(a)Anthracene	B(a)A	228	226, 114	1
Chrysene/Triphenylene	C&T	228	226, 114	1
7 Me-Benzo(a)Anthracene	MB(a)A	242	240, 226	1
Benzo(b)Fluoranthene	B(b)F	252	250, 126	1
Benzo(k)Fluoranthene	B(k)F	252	250, 126	1
Benzo(e)Pyrene	B(e)P	252	250, 126	1
Benzo(a)Pyrene	B(a)P	252	250, 126	1
Perylene	PER	252	250, 126	1
2 Me-Cholanthrene	MCH	268	252, 126	1
Indeno (1,2,3-cd)Pyrene	IP	276	274, 138	1
Dibenzo(a,h)Anthracene	D(ah)A	278	276, 138	1
Benzo(b)Chrysene	B(b)C	278	276, 138	1
Benzo(g,h,i)Perylene	B(ghi)P	276	274, 138	1
Anthanthrene	ANT	276	274, 138	1
d10-Acenaphthene	*AE	163	NA	1
d10-Anthracene	*AN	188	NA	1
d10-Pyrene	*PY	212	NA	1
d12-Benzo(a)Anthracene	*B(a)A	240	NA	1
d12-Benzo(a)Pyrene	*B(a)P	264	NA	1
d14-Dibenzo(a,h)Anthracene	*B(ah)A	292	NA	1
d12-Benzo(g,h,i)Perylene	*B(ghi)P	288	NA	1
d10-Fluoranthene	Perf. STD	212	NA	1

TABLE C5: Duplicate PAH Samples - Windsor

COMPOUND	17-Nov-87	17-Nov-87	%Diff	27-Feb-88	27-Feb-88	%Diff	26-Jun-88	26-Jun-88	%Diff
Acenaphthylene	17.16	21.98	24.6%	3.65	2.78	-27.2%	0.53	0.82	43.2%
Acenaphthene	8.39	22.88	92.7%	1.71	2.02	16.8%	0.77	3.82	132.7%
Fluorene	14.31	11.31	-23.4%	2.91	2.31	-23.1%	1.54	3.40	75.0%
2-Me-Fluorene	6.64	3.53	-61.1%	3.33	2.53	-27.6%	2.71	3.33	20.5%
Phenanthrene	45.25	35.88	-23.1%	12.71	8.88	-35.6%	15.18	19.43	24.6%
Anthracene	13.38	10.31	-26.0%	ND	0.83	-	1.06	0.43	-84.1%
Fluoranthene	25.23	15.92	-45.2%	3.68	3.93	6.6%	4.01	5.21	25.9%
Pyrene	17.06	10.45	-48.1%	2.57	2.63	2.4%	2.29	2.97	25.6%
Benzo(a)Fluorene	3.37	1.73	-64.1%	0.32	ND	-	0.34	0.46	30.1%
Benzo(b)Fluorene	2.33	1.18	-65.4%	0.08	ND	-	0.06	0.17	93.1%
1-Me-Pyrene	0.75	0.49	-41.6%	0.03	ND	-	0.05	0.14	96.3%
Benzo(g,h,i)Fluoranthene	1.28	0.78	-49.3%	0.34	0.29	-16.2%	0.22	0.29	29.4%
Benzo(a)Anthracene	3.37	1.65	-68.4%	0.12	0.22	54.8%	0.39	0.71	57.5%
Chrysene&Triphenylene	5.99	3.45	-53.8%	0.27	0.58	73.4%	0.68	0.85	22.1%
7-Me-Benzo(a)Anthracene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(b)Fluoranthene	10.72	6.04	-55.9%	1.03	1.77	52.9%	1.72	2.08	19.0%
Benzo(k)Fluoranthene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(e)Pyrene	2.86	1.59	-56.9%	0.31	0.43	33.5%	0.41	0.51	22.2%
Benzo(a)Pyrene	1.94	1.02	-62.0%	0.16	0.25	42.2%	0.49	0.64	25.3%
Perylene	0.39	0.20	-61.4%	ND	ND	-	0.06	0.12	58.6%
2-Me-Cholanthrene	ND	ND	-	ND	ND	-	ND	ND	-
Indeno(1,2,3-cd)Pyrene	5.23	2.94	-56.1%	0.39	0.40	1.5%	0.54	0.58	6.1%
Dibenzo(a,c)&(a,h)Anthracene	ND	0.10	-	0.07	ND	-	ND	0.13	-
Benzo(b)Chrysene	ND	0.29	-	0.07	ND	-	0.08	0.07	-4.9%
Benzo(g,h,i)Perylene	2.17	1.31	-49.7%	0.40	0.36	-10.6%	0.38	0.42	9.9%
Anthanthrene	0.09	ND	-	0.06	ND	-	ND	0.03	-
TOTAL PAH	187.91	155.02	-19.2%	34.23	30.20	-12.5%	33.54	46.61	32.6%
TSP (μg/m3)	52.74	51.43	-2.5%	68.90	82.10	17.5%	56.33	62.90	11.0%
ADSORBENT	PUF	PUF/XAD		PUF	PUF/XAD		PUF	PUF/XAD	
SAMPLE VOLUME (m^3)	857	490		972	554		790	691	

TABLE C5: Duplicate PAH Samples - Windsor

COMPOUND	20-Jul-88	20-Jul-88	%Diff	13-Aug-88	13-Aug-88	%Diff	Mean Absolute. % Diff.	Mean Conc. (ng/m³)
Acenaphthylene	0.86	2.11	84.2%	0.27	1.91	151.1%	66.0%	5.21
Acenaphthene	2.67	6.25	80.4%	1.33	1.08	-21.1%	68.7%	5.09
Fluorene	3.08	4.86	44.7%	3.86	13.02	108.5%	54.9%	6.06
2-Me-Fluorene	8.99	3.98	-77.1%	2.86	4.46	43.9%	46.0%	4.24
Phenanthrene	31.92	27.08	-16.4%	76.92	60.86	-23.3%	24.6%	33.41
Anthracene	ND	ND	-	9.04	- -	-	45.5%	5.02
Fluoranthene	5.22	5.29	1.2%	24.95	18.80	-28.1%	21.4%	11.22
Pyrene	2.94	3.05	3.5%	12.00	9.24	-26.0%	21.1%	6.52
Benzo(a)Fluorene	0.39	0.38	-1.5%	2.32	1.72	-30.0%	31.4%	1.23
Benzo(b)Fluorene	0.32	0.15	-70.3%	1.62	0.83	-63.8%	73.2%	0.75
1-Me-Pyrene	0.28	0.15	-57.8%	0.49	0.39	-21.4%	54.3%	0.31
Benzo(g,h,i)Fluoranthene	0.26	0.26	-1.3%	0.77	0.60	-23.8%	24.0%	0.51
Benzo(a)Anthracene	ND	0.15	-	1.62	1.19	-30.1%	52.7%	1.05
Chrysene&Triphenylene	0.35	0.40	13.7%	3.06	2.55	-18.1%	36.2%	1.82
7-Me-Benzo(a)Anthracene	ND	ND	-	ND	ND	-	-	-
Benzo(b)Fluoranthene	0.69	0.61	-12.5%	3.45	3.12	-10.0%	30.0%	3.12
Benzo(k)Fluoranthene	ND	ND	-	ND	ND	-	-	-
Benzo(e)Pyrene	0.22	0.20	-10.9%	0.88	0.78	-11.3%	27.0%	0.82
Benzo(a)Pyrene	0.14	0.12	-12.5%	0.53	0.56	4.1%	29.2%	0.59
Perylene	ND	ND	-	0.09	0.08	-14.1%	44.7%	0.16
2-Me-Cholanthrene	ND	ND	-	ND	ND	-	-	-
Indeno(1,2,3-cd)Pyrene	0.28	0.23	-18.9%	0.52	0.60	15.5%	19.6%	1.17
Dibenzo(a,c)&(a,h)Anthracene	ND	ND	-	0.13	ND	-	-	-
Benzo(b)Chrysene	ND	ND	-	ND	ND	-	4.9%	0.13
Benzo(g,h,i)Perylene	0.35	0.29	-17.6%	0.41	0.49	18.4%	21.2%	0.66
Anthanthrene	ND	ND	-	0.03	0.05	44.0%	43.9%	0.05
TOTAL PAH	58.96	55.58	-5.9%	147.13	122.42	-18.3%	17.7%	87.16
TSP (μg/m3)	51.40	48.90	-5.0%	117.50	113.30	-3.6%	7.9%	
ADSORBENT	PUF	PUF/XAD		PUF	PUF/XAD			
SAMPLE VOLUME (m³)	720	653		637	612			

Table C6: Duplicate PAH Samples - Walpole Island

COMPOUNDS	22-Mar-88	22-Mar-88	% Diff	15-Apr-88	15-Apr-88	% Diff	9-May-88	9-May-88	% Diff.
Acenaphthylene	0.09	0.03	-107%	0.05	ND	-	0.01	0.10	158%
Acenaphthene	0.15	0.06	-91%	0.16	ND	-	0.49	ND	-
Fluorene	0.45	0.14	-105%	0.30	ND	-	0.83	1.16	34%
2-Me-Fluorene	0.45	0.14	-105%	0.30	ND	-	1.54	1.49	-4%
Phenanthrene	1.58	0.80	-65%	1.14	0.08	-175%	4.43	4.27	-4%
Anthracene	ND	ND	-	ND	ND	-	ND	ND	-
Fluoranthene	0.69	0.45	-41%	0.36	0.08	-130%	1.09	0.91	-18%
Pyrene	0.36	0.25	-35%	0.19	0.06	-104%	0.63	0.59	-6%
Benzo(a)Fluorene	0.06	0.04	-32%	0.04	ND	-	0.08	0.10	20%
Benzo(b)Fluorene	0.02	ND	-	ND	ND	-	0.05	ND	-
1-Me-Pyrene	0.01	ND	-	ND	ND	-	0.02	ND	-
Benzo(g,h,i)Fluoranthene	0.06	0.06	-3%	0.04	ND	-	0.06	ND	-
Benzo(a)Anthracene	0.05	ND	-	0.01	ND	-	0.04	ND	-
Chrysene&Triphenylene	0.19	0.18	-2%	0.05	0.06	17%	0.18	0.14	-27%
7-Me-Benzo(a)Anthracene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(b)Fluoranthene	0.36	0.48	28%	0.12	0.23	27%	0.21	0.24	10%
Benzo(k)Fluoranthene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(e)Pyrene	0.09	0.10	6%	0.04	ND	-	0.06	0.07	13%
Benzo(a)Pyrene	0.08	0.08	4%	0.03	ND	-	0.05	ND	-
Perylene	ND	ND	-	ND	ND	-	ND	ND	-
2-Me-Cholanthrene	ND	ND	-	ND	ND	-	ND	ND	-
Indeno(1,2,3-cd)Pyrene	0.09	0.13	31%	0.03	ND	-	0.06	ND	-
Dibenzo(a,c)&(a,h)Anthracene	0.02	ND	-	ND	ND	-	ND	ND	-
Benzo(b)Chrysene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(g,h,i)Perylene	0.08	0.07	-14%	0.03	ND	-	0.05	ND	-
Anthanthrene	ND	ND	-	ND	ND	-	ND	ND	-
TOTAL PAH	4.90	3.02	-48%	2.88	0.43	-148%	9.86	9.07	-8%
TSP ($\mu g/m^3$)	59.72	19.88	-100%	157.70	28.77	-138%	171.39	140.50	-20%
ADSORBENT	PUF	PUF/XAD		PUF	PUF/XAD		PUF	PUF/XAD	
SAMPLE VOLUME (m^3)	859	709		772	654		845	592	

Table C6: Duplicate PAH Samples - Walpole Island

COMPOUNDS	2-Jun-88	2-Jun-88	% Diff.	26-Jun-88	26-Jun-88	% Diff.	20-Jul-88	20-Jul-88	% Diff.
Acenaphthylene	0.03	0.08	103%	0.16	0.03	-138%	0.06	0.18	96%
Acenaphthene	0.16	0.50	103%	0.71	0.09	-157%	0.19	0.82	126%
Fluorene	0.36	0.67	59%	0.75	0.27	-93%	0.50	0.89	56%
2-Me-Fluorene	1.09	0.76	-37%	0.83	0.50	-49%	1.03	1.02	-1%
Phenanthrene	1.16	1.74	40%	2.77	1.86	-39%	3.62	3.31	-9%
Anthracene	ND	ND	-	ND	0.04	-	ND	ND	-
Fluoranthene	0.27	0.25	-7%	0.49	0.39	-22%	0.59	0.42	-34%
Pyrene	0.15	0.13	-16%	0.30	0.23	-25%	0.34	0.22	-43%
Benzo(a)Fluorene	0.01	0.02	43%	0.03	0.03	-19%	ND	0.07	-
Benzo(b)Fluorene	ND	ND	-	ND	ND	-	0.02	ND	-
1-Me-Pyrene	ND	ND	-	ND	ND	-	0.02	ND	-
Benzo(g,h,i)Fluoranthene	ND	ND	-	ND	ND	-	0.02	ND	-
Benzo(a)Anthracene	ND	ND	-	ND	0.01	-	ND	ND	-
Chrysene&Triphenylene	0.03	ND	-	0.07	0.04	-47%	0.03	0.04	35%
7-Me-Benzo(a)Anthracene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(b)Fluoranthene	0.09	ND	-	0.09	0.10	15%	ND	0.11	-
Benzo(k)Fluoranthene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(e)Pyrene	0.03	ND	-	0.03	0.03	-19%	ND	ND	-
Benzo(a)Pyrene	ND	ND	-	ND	ND	-	ND	ND	-
Perylene	ND	ND	-	ND	ND	-	ND	ND	-
2-Me-Cholanthrene	ND	ND	-	ND	ND	-	ND	ND	-
Indeno(1,2,3-cd)Pyrene	ND	ND	-	ND	ND	-	ND	ND	-
Dibenzo(a,c)&(a,h)Anthracene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(b)Chrysene	ND	ND	-	ND	ND	-	ND	ND	-
Benzo(g,h,i)Perylene	ND	ND	-	ND	ND	-	ND	ND	-
Anthanthrene	ND	ND	-	ND	ND	-	ND	ND	-
TOTAL PAH	3.39	4.15	20%	6.23	3.63	-53%	6.41	7.08	10%
TSP ($\mu g/m^3$)	163.24	75.32	-74%	62.27	55.30	-12%	41.78	68.84	49%
ADSORBENT	PUF	PUF/XAD		PUF	PUF/XAD		PUF	PUF/XAD	
SAMPLE VOLUME (m^3)	741	477		575	694		641	450	

Table C6: Duplicate PAH Samples - Walpole Island

COMPOUNDS	Mean Absolute % Diff.	Mean Conc. (ng/m³)
Acenaphthylene	120%	0.07
Acenaphthene	119%	0.33
Fluorene	69%	0.58
2-Me-Fluorene	39%	0.83
Phenanthrene	55%	2.23
Anthracene	-	-
Fluoranthene	42%	0.50
Pyrene	38%	0.29
Benzo(a)Fluorene	29%	0.05
Benzo(b)Fluorene	-	-
1-Me-Pyrene	-	-
Benzo(g,h,i)Fluoranthene	-	-
Benzo(a)Anthracene	-	
Chrysene&Triphenylene	25%	0.09
7-Me-Benzo(a)Anthracene	-	-
Benzo(b)Fluoranthene	20%	0.20
Benzo(k)Fluoranthene	-	-
Benzo(e)Pyrene	13%	0.06
Benzo(a)Pyrene	-	-
Perylene	-	-
2-Me-Cholanthrene	-	-
Indeno(1,2,3-cd)Pyrene	-	-
Dibenzo(a,c)&(a,h)Anthracene	-	-
Benzo(b)Chrysene	-	-
Benzo(g,h,i)Perylene	-	-
Anthanthrene	-	-
TOTAL PAH	48%	5.09
TSP (μg/m³)	66%	
ADSORBENT		
SAMPLE VOLUME (m³)		

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	26-Jul-87	26-Jul-87	1-Aug-87	1-Aug-87	7-Aug-87	7-Aug-87
Acenaphthylene	ND	0.37	ND	0.63	ND	0.34
Acenaphthene	ND	1.14	ND	1.39	ND	5.21
Fluorene	0.01	1.77	0.04	2.63	ND	4.03
2-Me-Fluorene	ND	2.00	ND	3.45	0.03	1.01
Phenanthrene	0.20	29.24	0.29	26.05	0.12	9.29
Anthracene	0.02	1.59	ND	1.55	ND	0.25
Fluoranthene	0.29	12.01	0.34	6.64	0.15	1.11
Pyrene	0.21	5.76	0.21	3.45	0.11	0.50
Benzo(a)Fluorene	0.07	0.70	0.04	0.42	ND	0.05
Benzo(b)Fluorene	0.03	0.40	ND	0.21	0.05	0.02
1-Me-Pyrene	0.03	0.20	ND	0.13	0.04	0.02
Benzo(g,h,i)Fluoranthene	ND	0.31	ND	0.25	0.04	ND
Benzo(a)Anthracene	ND	0.13	0.08	0.04	0.03	0.01
Chrysene&Triphenylene	0.23	0.56	0.23	0.25	0.13	0.02
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.64	0.14	0.46	ND	0.17	0.01
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.17	0.03	0.15	ND	0.05	ND
Benzo(a)Pyrene	0.15	ND	0.11	ND	0.05	ND
Perylene	0.03	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.19	ND	ND	ND	ND	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.16	ND	0.15	ND	ND	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	2.45	56.34	2.10	47.08	1.00	21.88
RECOVERY (%)						
*AE	20	74	-	87	31	57
*AN	65	82	17	106	78	77
*PY	95	97	80	119	108	96
*B(a)A	99	93	94	112	110	94
*B(a)P	88	78	74	88	90	77
*D(ah)A	91	82	86	99	97	84
*B(ghi)P	91	83	89	102	101	88
Perf. STD	103	104	84	104	121	109
SAMPLE DATE	26-Jul-87	26-Jul-87	1-Aug-87	1-Aug-87	7-Aug-87	7-Aug-87
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	916	916	476	476	920	920
TSP (μg/m³)	45.5		58.8		17.5	
SAMPLE ID	WW-1	WW-2	WW-3	WW-4	WW-10	WW-11

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	13-Aug-87	13-Aug-87	6-Sep-87	6-Sep-87	12-Sep-87	12-Sep-87
Acenaphthylene	ND	0.15	ND	0.44	ND	0.56
Acenaphthene	ND	0.54	ND	ND	ND	0.71
Fluorene	0.01	1.33	0.01	1.85	0.01	2.52
2-Me-Fluorene	ND	2.26	ND	2.24	0.06	3.44
Phenanthrene	0.23	ND	0.20	15.24	0.25	18.90
Anthracene	0.03	ND	ND	ND	ND	ND
Fluoranthene	0.39	9.13	0.26	8.61	0.25	8.71
Pyrene	0.27	4.69	0.19	4.11	0.18	4.79
Benzo(a)Fluorene	0.08	0.51	0.06	0.49	0.08	0.67
Benzo(b)Fluorene	0.03	0.20	ND	0.20	0.02	0.30
1-Me-Pyrene	ND	0.18	0.04	0.17	0.05	0.26
Benzo(g,h,i)Fluoranthene	0.05	0.31	0.05	0.25	0.06	0.39
Benzo(a)Anthracene	0.10	0.06	ND	0.07	ND	0.16
Chrysene&Triphenylene	0.24	0.39	0.21	0.38	0.26	0.48
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.53	0.06	0.47	0.11	0.58	0.08
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.15	0.02	0.15	0.03	0.16	ND
Benzo(a)Pyrene	0.15	ND	0.08	ND	0.08	ND
Perylene	0.03	ND	0.01	ND	0.01	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.14	ND	0.14	ND	0.13	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.15	ND	0.14	ND	0.13	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	2.58	19.83	2.02	34.20	2.30	41.96
RECOVERY (%)						
*AE	42	81	5	79	4	77
*AN	85	4	33	4	52	4
*PY	105	100	90	104	95	94
*B(a)A	105	109	100	109	103	99
*B(a)P	96	93	73	96	93	85
*D(ah)A	85	88	87	90	90	79
*B(ghi)P	90	88	91	91	89	80
Perf. STD	108	99	91	103	100	99
SAMPLE DATE	13-Aug-87	13-Aug-87	6-Sep-87	6-Sep-87	12-Sep-87	12-Sep-87
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	957	957	950	950	878	878
TSP (μg/m³)	93.6		60.8		72.3	
SAMPLE ID	WW-12	WW-13	WW-17	WW-18	WW-21	WW-22

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	18-Sep-87	18-Sep-87	24-Sep-87	24-Sep-87	6-Oct-87	6-Oct-87
Acenaphthylene	ND	16.50	0.02	1.92	ND	2.18
Acenaphthene	ND	15.29	0.01	1.51	ND	0.92
Fluorene	ND	16.99	0.02	2.40	ND	5.30
2-Me-Fluorene	ND	3.76	0.04	7.40	0.04	8.99
Phenanthrene	0.32	41.49	0.39	54.22	0.23	19.76
Anthracene	ND	3.79	0.10	9.90	0.06	ND
Fluoranthene	0.60	9.47	0.85	22.12	0.59	4.44
Pyrene	0.44	6.80	0.62	14.95	0.54	4.22
Benzo(a)Fluorene	0.14	1.02	0.21	2.95	0.18	0.64
Benzo(b)Fluorene	0.10	0.53	0.13	2.52	0.11	0.33
1-Me-Pyrene	0.09	0.36	0.05	0.64	0.10	0.33
Benzo(g,h,i)Fluoranthene	0.20	0.29	0.21	1.03	0.42	0.30
Benzo(a)Anthracene	0.26	0.39	0.52	2.80	ND	0.08
Chrysene&Triphenylene	0.63	0.72	1.29	3.62	0.79	0.12
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	2.08	ND	6.54	0.61	1.86	0.03
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.65	ND	1.70	0.09	0.59	ND
Benzo(a)Pyrene	0.33	ND	0.67	0.03	0.59	ND
Perylene	ND	ND	0.11	ND	0.08	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.62	ND	2.76	ND	1.40	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	0.09	ND
Benzo(b)Chrysene	ND	ND	0.11	ND	0.06	ND
Benzo(g,h,i)Perylene	0.76	ND	1.31	ND	0.96	ND
Anthanthrene	ND	ND	0.04	ND	0.06	ND
TOTAL PAH	7.22	117.49	17.71	128.72	8.73	47.65
RECOVERY (%)						
*AE	61	INT	48	97	17	97
*AN	53	93	87	84	73	89
*PY	108	101	109	97	97	98
*B(a)A	119	97	111	98	98	96
*B(a)P	109	78	111	91	101	93
*D(ah)A	110	83	119	102	109	102
*B(ghi)P	111	86	110	95	97	96
Perf. STD	112	112	106	98	99	98
SAMPLE DATE	18-Sep-87	18-Sep-87	24-Sep-87	24-Sep-87	6-Oct-87	6-Oct-87
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	697	697	938	938	903	903
TSP (μg/m³)	82.9		76.0		43.3	
SAMPLE ID	WW-24	WW-25A	WW-26	WW-27	WW-28	WW-29

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	12-Oct-87	12-Oct-87	18-Oct-87	18-Oct-87	24-Oct-87	24-Oct-87
Acenaphthylene	ND	3.04	ND	9.76	0.01	7.28
Acenaphthene	ND	3.20	ND	17.41	ND	2.50
Fluorene	ND	3.41	ND	16.32	0.01	14.39
2-Me-Fluorene	0.04	4.15	ND	6.38	0.04	13.80
Phenanthrene	0.13	13.85	0.36	56.77	0.27	43.15
Anthracene	0.03	1.50	ND	13.43	0.12	9.21
Fluoranthene	0.26	3.31	1.01	18.41	0.84	12.20
Pyrene	0.20	2.55	0.81	12.21	0.76	9.23
Benzo(a)Fluorene	0.07	0.29	0.34	1.88	0.37	1.55
Benzo(b)Fluorene	0.04	0.15	0.23	1.44	0.26	0.70
1-Me-Pyrene	0.03	0.10	0.08	0.41	0.14	0.45
Benzo(g,h,i)Fluoranthene	0.14	0.18	0.30	0.54	0.77	0.51
Benzo(a)Anthracene	0.15	0.02	0.94	0.66	1.08	0.28
Chrysene&Triphenylene	0.37	0.07	2.18	1.20	2.22	0.39
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	1.14	0.01	7.02	ND	5.24	0.02
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.34	ND	1.84	ND	1.52	ND
Benzo(a)Pyrene	0.16	ND	0.99	ND	0.65	ND
Perylene	0.02	ND	0.13	ND	0.11	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.75	ND	2.66	ND	2.72	ND
Dibenzo(a,c)&(a,h)Anthracen	0.05	ND	ND	ND	0.53	ND
Benzo(b)Chrysene	0.02	ND	0.11	ND	0.22	ND
Benzo(g,h,i)Perylene	0.45	ND	1.39	ND	1.74	ND
Anthanthrene	0.01	ND	0.04	ND	0.03	ND
TOTAL PAH	4.42	35.83	20.41	156.83	19.63	115.67
RECOVERY (%)						
*AE	4	78	30	77	16	138
*AN	63	71	57	76	68	79
*PY	89	82	89	83	92	82
*B(a)A	90	76	95	81	93	81
*B(a)P	86	61	95	83	92	69
*D(ah)A	96	77	105	83	106	70
*B(ghi)P	90	73	95	80	90	69
Perf. STD	87	96	95	98	98	95
SAMPLE DATE	12-Oct-87	12-Oct-87	18-Oct-87	18-Oct-87	24-Oct-87	24-Oct-87
SAMPLE TYPE	FILTER	PUF	FILTER	PUF/XAD	FILTER	PUF
SAMPLE VOLUME (m³)	988	988	533	533	927	927
TSP (μg/m³)	34.9		62.9		68.1	
SAMPLE ID	WW-32	WW-33	WW-36'	WW-37'	WW-38	WW-39

Table C7. PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	30-Oct-87	30-Oct-87	5-Nov-87	5-Nov-87	11-Nov-87	11-Nov-87
Acenaphthylene	ND	6.31	ND	3.11	ND	20.26
Acenaphthene	ND	10.29	ND	1.37	0.02	59.97
Fluorene	0.02	5.80	ND	2.83	0.03	22.70
2-Me-Fluorene	0.02	4.30	ND	3.59	0.03	9.32
Phenanthrene	0.37	17.72	0.36	10.39	0.63	69.43
Anthracene	0.18	3.87	ND	1.12	0.69	24.13
Fluoranthene	1.08	4.56	0.63	2.27	7.76	20.88
Pyrene	0.90	3.24	0.46	2.03	5.89	11.33
Benzo(a)Fluorene	0.26	0.47	0.14	0.24	4.18	0.43
Benzo(b)Fluorene	0.15	0.12	0.06	0.13	3.39	0.21
1-Me-Pyrene	0.12	0.02	0.05	0.09	0.66	0.16
Benzo(g,h,i)Fluoranthene	0.41	0.22	0.22	0.10	2.04	0.14
Benzo(a)Anthracene	0.69	0.07	0.16	0.01	5.31	0.02
Chrysene&Triphenylene	1.65	0.18	0.47	0.06	11.12	0.05
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	4.07	0.02	0.35	0.01	4.93	0.01
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	1.18	ND	0.29	ND	3.08	ND
Benzo(a)Pyrene	0.79	ND	0.20	ND	1.83	ND
Perylene	0.14	ND	0.03	ND	0.29	ND
2-Me-Cholanthrene	ND	ND	ND	ND	0.02	ND
Indeno(1,2,3-cd)Pyrene	2.36	ND	0.61	ND	3.48	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	0.04	ND	0.57	ND
Benzo(b)Chrysene	0.08	ND	ND	ND	0.15	ND
Benzo(g,h,i)Perylene	1.30	ND	0.35	ND	1.66	ND
Anthanthrene	0.04	ND	ND	ND	0.05	ND
TOTAL PAH	15.84	57.20	4.42	27.36	57.82	239.05
RECOVERY (%)						
*AE	42	125	-	-	-	190
*AN	66	70	55	93	62	75
*PY	92	73	88	99	90	88
*B(a)A	96	70	87	94	91	85
*B(a)P	92	63	85	85	90	82
*D(ah)A	110	76	92	97	106	88
*B(ghi)P	97	70	86	92	88	82
Perf. STD	95	96	94	101	95	89
SAMPLE DATE	30-Oct-87	30-Oct-87	5-Nov-87	5-Nov-87	11-Nov-87	11-Nov-87
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF
SAMPLE VOLUME (m³)	982	982	953	953	953	953
TSP (μg/m³)	94.1		44.9		79.6	
SAMPLE ID	WW-40'	WW-41'	WW-44	WW-45	W-48	W-49

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	17-Nov-87	17-Nov-87	23-Nov-87	23-Nov-87	5-Dec-87	5-Dec-87
Acenaphthylene	ND	17.16	ND	6.03	ND	3.49
Acenaphthene	ND	8.39	ND	2.76	ND	1.09
Fluorene	ND	14.31	0.02	4.53	0.02	2.84
2-Me-Fluorene	0.01	6.63	ND	5.35	0.05	4.52
Phenanthrene	0.57	44.68	0.42	17.98	0.42	13.53
Anthracene	0.33	13.06	0.09	2.85	0.13	1.58
Fluoranthene	3.20	22.03	1.10	6.65	0.87	3.76
Pyrene	2.33	14.73	0.87	4.89	0.72	3.35
Benzo(a)Fluorene	1.07	2.30	0.30	0.70	0.25	0.32
Benzo(b)Fluorene	0.78	1.55	0.23	0.47	0.16	0.18
1-Me-Pyrene	0.16	0.58	0.11	0.26	0.11	0.11
Benzo(g,h,i)Fluoranthene	0.77	0.51	0.36	0.36	0.58	0.14
Benzo(a)Anthracene	2.86	0.51	0.78	0.15	0.29	0.03
Chrysene&Triphenylene	5.05	0.93	1.44	0.32	0.81	0.06
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	10.69	0.04	2.84	0.12	1.60	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	2.86	ND	0.80	0.03	0.47	ND
Benzo(a)Pyrene	1.94	ND	0.66	0.04	0.23	ND
Perylene	0.39	ND	0.14	ND	0.04	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	5.23	ND	0.79	0.03	0.56	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	0.15	ND	0.07	ND
Benzo(b)Chrysene	ND	ND	0.08	ND	ND	ND
Benzo(g,h,i)Perylene	2.17	ND	0.86	0.03	0.70	ND
Anthanthrene	0.09	ND	0.04	ND	ND	ND
TOTAL PAH	40.50	147.41	12.07	53.53	8.06	34.99
RECOVERY (%)						
*AE	-	113	34	100	16	94
*AN	55	73	80	85	83	78
*PY	94	77	84	89	98	90
*B(a)A	94	76	91	86	96	85
*B(a)P	95	71	85	78	89	70
*D(ah)A	122	75	92	81	91	80
*B(ghi)P	96	72	90	83	90	83
Perf. STD	104	91	111	109	110	96
SAMPLE DATE	17-Nov-87	17-Nov-87	23-Nov-87	23-Nov-87	5-Dec-87	5-Dec-87
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	857	857	1014	1014	1015	1015
TSP (μg/m³)	52.7		44.9		29.7	
SAMPLE ID	W-50	W-51	WW-56	WW-57	WW-58	WW-59

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	11-Dec-87	11-Dec-87	23-Dec-87	23-Dec-87	29-Dec-87	29-Dec-87
Acenaphthylene	0.02	2.59	0.02	27.13	ND	8.30
Acenaphthene	0.01	2.05	ND	9.50	ND	2.16
Fluorene	0.03	4.56	0.03	24.73	ND	2.82
2-Me-Fluorene	0.03	6.19	0.03	12.46	ND	3.61
Phenanthrene	0.48	44.25	1.17	63.05	0.32	9.79
Anthracene	0.30	11.56	0.59	15.41	0.06	1.49
Fluoranthene	0.96	14.85	3.70	16.05	1.39	2.79
Pyrene	0.87	10.69	3.13	11.30	1.24	2.00
Benzo(a)Fluorene	0.37	1.86	1.16	1.28	0.35	0.16
Benzo(b)Fluorene	0.36	1.57	0.86	0.96	0.19	ND
1-Me-Pyrene	0.17	0.42	0.49	0.35	0.16	ND
Benzo(g,h,i)Fluoranthene	0.54	0.58	1.82	0.40	0.67	0.06
Benzo(a)Anthracene	1.92	0.69	3.88	0.28	0.22	ND
Chrysene&Triphenylene	0.66	0.90	5.41	0.36	0.70	0.10
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	3.00	0.05	8.71	ND	0.86	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	1.46	ND	2.58	ND	0.32	ND
Benzo(a)Pyrene	1.20	ND	3.32	ND	0.13	ND
Perylene	0.28	ND	0.69	ND	ND	ND
2-Me-Cholanthrene	0.01	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	1.35	ND	3.26	ND	0.32	ND
Dibenzo(a,c)&(a,h)Anthracen	0.35	ND	0.54	ND	ND	ND
Benzo(b)Chrysene	0.21	ND	0.36	ND	ND	ND
Benzo(g,h,i)Perylene	1.37	ND	3.00	ND	0.54	ND
Anthanthrene	0.06	ND	0.26	ND	ND	ND
TOTAL PAH	16.03	102.80	45.00	183.28	7.45	33.28
RECOVERY (%)						
*AE	53	INT	15	INT	78	81
*AN	85	84	86	80	86	84
*PY	84	88	99	82	97	89
*B(a)A	76	88	96	80	92	87
*B(a)P	64	76	86	78	82	85
*D(ah)A	76	80	107	72	72	97
*B(ghi)P	59	80	87	76	81	101
Perf. STD	100	96	109	100	116	128
SAMPLE DATE	11-Dec-87	11-Dec-87	23-Dec-87	23-Dec-87	29-Dec-87	29-Dec-87
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	4957	4957	998	998	631	631
TSP (μg/m³)	37.6		90.0		27.8	
SAMPLE ID	WW-62	WW-63	WW-64	WW-65	*WW-66	*WW-67

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	4-Jan-88	4-Jan-88	10-Jan-88	10-Jan-88	28-Jan-88	28-Jan-88
Acenaphthylene	ND	14.33	0.06	20.87	ND	19.28
Acenaphthene	ND	14.61	ND	6.62	ND	14.29
Fluorene	0.07	14.43	0.06	8.09	ND	12.17
2-Me-Fluorene	ND	5.70	ND	6.56	ND	7.41
Phenanthrene	3.02	30.93	1.84	24.66	0.43	36.93
Anthracene	0.40	7.01	0.21	4.40	0.13	7.14
Fluoranthene	4.86	6.77	7.46	5.15	1.67	9.60
Pyrene	3.70	5.03	6.12	3.60	1.40	6.76
Benzo(a)Fluorene	0.77	0.21	1.54	0.15	0.59	0.48
Benzo(b)Fluorene	0.49	0.14	0.74	0.08	0.37	0.29
1-Me-Pyrene	0.29	0.05	0.95	0.04	0.20	0.09
Benzo(g,h,i)Fluoranthene	1.07	0.04	2.35	0.03	1.29	0.09
Benzo(a)Anthracene	0.75	ND	0.88	ND	0.49	ND
Chrysene&Triphenylene	2.33	ND	5.03	ND	2.80	0.05
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	4.04	ND	9.78	ND	4.35	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.90	ND	0.52	ND	0.92	ND
Benzo(a)Pyrene	0.81	ND	2.47	ND	0.37	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	1.18	ND	2.63	ND	1.07	ND
Dibenzo(a,c)&(a,h)Anthracen	0.23	ND	0.43	ND	0.19	ND
Benzo(b)Chrysene	ND	ND	0.38	ND	0.14	ND
Benzo(g,h,i)Perylene	1.44	ND	2.61	ND	1.27	ND
Anthanthrene	0.12	ND	0.06	ND	0.05	ND
TOTAL PAH	26.49	99.26	46.12	80.24	17.73	114.60
RECOVERY (%)						
*AE	42	178	45	185	20	209
*AN	83	85	91	83	79	78
*PY	96	88	108	91	106	90
*B(a)A	91	80	107	86	106	88
*B(a)P	86	75	21	78	92	83
*D(ah)A	89	77	112	69	79	82
*B(ghi)P	83	80	98	73	76	83
Perf. STD	120	104	110	106	113	106
SAMPLE DATE	4-Jan-88	4-Jan-88	10-Jan-88	10-Jan-88	28-Jan-88	28-Jan-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	995	995	1006	1006	971	971
TSP (μg/m³)	50.6		84.0		75.1	
SAMPLE ID	WW-70	WW-71	WW-72	WW-73	WW-80	WW-81

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	9-Feb-88	9-Feb-88	21-Feb-88	21-Feb-88	27-Feb-88	27-Feb-88
Acenaphthylene	ND	8.23	ND	4.46	ND	2.78
Acenaphthene	ND	5.94	ND	5.68	ND	2.02
Fluorene	ND	7.10	0.03	4.86	ND	2.31
2-Me-Fluorene	ND	7.07	ND	2.52	ND	2.53
Phenanthrene	0.18	20.39	1.00	17.44	0.36	8.51
Anthracene	ND	3.45	0.22	ND	ND	0.83
Fluoranthene	0.40	6.21	3.01	3.56	0.97	2.96
Pyrene	0.31	4.81	1.91	2.20	0.61	2.02
Benzo(a)Fluorene	0.08	0.41	0.50	0.11	ND	ND
Benzo(b)Fluorene	ND	0.25	0.34	ND	ND	ND
1-Me-Pyrene	ND	0.09	0.12	ND	ND	ND
Benzo(g,h,i)Fluoranthene	0.20	0.12	0.60	ND	0.29	ND
Benzo(a)Anthracene	0.17	0.02	0.70	ND	0.22	ND
Chrysene&Triphenylene	0.65	0.03	1.73	ND	0.58	ND
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	3.05	ND	3.29	ND	1.77	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.33	ND	0.87	ND	0.43	ND
Benzo(a)Pyrene	0.44	ND	0.68	ND	0.25	ND
Perylene	ND	ND	0.12	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.94	ND	0.95	ND	0.40	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	0.10	ND	ND	ND
Benzo(b)Chrysene	ND	ND	0.06	ND	ND	ND
Benzo(g,h,i)Perylene	0.97	ND	0.74	ND	0.36	ND
Anthanthrene	ND	ND	0.04	ND	ND	ND
TOTAL PAH	7.73	64.11	17.02	40.83	6.24	23.96
RECOVERY (%)						
*AE	32	178	28	95	21	67
*AN	70	74	71	62	48	58
*PY	88	83	94	70	75	68
*B(a)A	89	78	97	68	79	64
*B(a)P	30	71	91	67	75	59
*D(ah)A	89	69	102	74	88	70
*B(ghi)P	53	72	95	75	86	71
Perf. STD	104	89	117	97	97	91
SAMPLE DATE	9-Feb-88	9-Feb-88	21-Feb-88	21-Feb-88	27-Feb-88	27-Feb-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	979	979	1010	1010	554	554
TSP (μg/m³)	49.7		62.4		82.1	
SAMPLE ID	WW-85	WW-86	WW-87	WW-88	*WW-92	*WW-92

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	4-Mar-88	4-Mar-88	10-Mar-88	10-Mar-88	16-Mar-88	16-Mar-88
Acenaphthylene	ND	5.76	ND	3.70	ND	3.62
Acenaphthene	ND	2.29	ND	2.51	ND	2.30
Fluorene	ND	3.72	ND	2.29	ND	2.75
2-Me-Fluorene	ND	5.21	ND	2.70	ND	3.99
Phenanthrene	0.34	14.50	0.38	9.17	0.24	10.12
Anthracene	0.05	1.81	ND	0.85	ND	1.19
Fluoranthene	1.51	4.03	1.07	2.98	0.70	2.67
Pyrene	1.14	2.67	0.63	1.95	0.41	2.18
Benzo(a)Fluorene	0.38	0.19	0.16	ND	0.12	0.18
Benzo(b)Fluorene	0.22	0.07	ND	ND	ND	0.08
1-Me-Pyrene	0.09	ND	ND	ND	ND	0.05
Benzo(g,h,i)Fluoranthene	0.61	0.07	0.31	ND	0.23	0.07
Benzo(a)Anthracene	0.35	ND	0.16	ND	0.12	ND
Chrysene&Triphenylene	1.02	ND	0.63	ND	0.44	ND
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	1.71	ND	1.07	ND	1.24	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.50	ND	0.31	ND	0.25	ND
Benzo(a)Pyrene	0.33	ND	0.19	ND	0.13	ND
Perylene	0.07	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.52	ND	0.31	ND	0.31	ND
Dibenzo(a,c)&(a,h)Anthracen	0.07	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.52	ND	0.35	ND	0.31	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	9.44	40.23	5.56	26.15	4.49	29.21
RECOVERY (%)						
*AE	23	106	46	59	-	109
*AN	46	70	66	52	45	65
*PY	69	74	89	67	62	68
*B(a)A	65	68	89	62	58	57
*B(a)P	58	62	82	57	52	51
*D(ah)A	52	61	75	61	57	43
*B(ghi)P	52	62	75	64	59	46
Perf. STD	100	93	122	90	80	83
SAMPLE DATE	4-Mar-88	4-Mar-88	10-Mar-88	10-Mar-88	16-Mar-88	16-Mar-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUF/XAD	FILTER	PUF
SAMPLE VOLUME (m³)	879	879	637	637	839	839
TSP (μg/m³)	70.7		64.4		50.5	
SAMPLE ID	WW-93	WW-94	*WW-97	*WW-98	WW-101	WW-102

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	22-Mar-88	22-Mar-88	28-Mar-88	28-Mar-88	3-Apr-88	3-Apr-88
Acenaphthylene	0.04	3.42	ND	8.63	ND	3.29
Acenaphthene	0.04	1.68	ND	3.32	ND	7.91
Fluorene	0.02	2.93	0.05	4.84	0.06	8.51
2-Me-Fluorene	0.49	3.67	0.30	5.43	0.22	6.04
Phenanthrene	0.45	11.58	0.77	18.74	0.59	38.26
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	0.53	2.60	0.82	4.33	0.58	8.41
Pyrene	0.36	1.80	0.56	3.49	0.48	5.61
Benzo(a)Fluorene	0.08	0.14	0.14	0.33	0.15	0.78
Benzo(b)Fluorene	ND	0.11	ND	0.12	ND	ND
1-Me-Pyrene	ND	ND	ND	ND	0.04	0.50
Benzo(g,h,i)Fluoranthene	0.15	0.08	0.23	0.21	0.15	0.45
Benzo(a)Anthracene	0.13	ND	ND	0.16	ND	ND
Chrysene&Triphenylene	0.41	0.02	0.70	ND	0.67	0.54
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	1.27	ND	2.20	0.05	1.89	0.09
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.29	ND	0.51	ND	0.56	ND
Benzo(a)Pyrene	0.22	ND	0.33	ND	0.37	ND
Perylene	0.06	ND	ND	ND	0.07	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.40	ND	0.75	ND	0.52	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.30	ND	0.70	ND	0.46	ND
Anthanthrene	0.02	ND	ND	ND	ND	ND
TOTAL PAH	5.26	28.03	8.07	49.65	6.82	80.39
RECOVERY (%)						
*AE	27	133	15	98	52	69
*AN	77	87	74	84	80	89
*PY	95	89	92	90	95	87
*B(a)A	96	90	92	88	91	93
*B(a)P	85	77	80	75	76	80
*D(ah)A	97	87	93	90	94	92
*B(ghi)P	97	89	95	87	92	94
Perf. STD	108	103	105	104	107	111
SAMPLE DATE	22-Mar-88	22-Mar-88	28-Mar-88	28-Mar-88	3-Apr-88	3-Apr-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	854	854	427	427	538	538
TSP (μg/m³)	92.6		74.4		58.7	
SAMPLE ID	WW-103	WW-104	WW-107	WW-108	*WW-109	*WW-110

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	15-Apr-88	15-Apr-88	21-Apr-38	21-Apr-88	27-Apr-88	27-Apr-88
Acenaphthylene	ND	6.01	0.04	2.78	ND	5.61
Acenaphthene	ND	3.88	ND	1.70	ND	3.99
Fluorene	0.03	2.37	0.04	4.62	0.02	7.20
2-Me-Fluorene	ND	4.53	0.19	5.19	0.19	4.21
Phenanthrene	0.71	23.90	0.40	20.55	0.67	27.36
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	1.13	4.17	0.39	4.01	0.93	5.23
Pyrene	0.69	2.89	0.27	2.92	0.71	3.63
Benzo(a)Fluorene	0.20	0.22	0.07	0.31	0.26	0.49
Benzo(b)Fluorene	0.17	0.17	0.02	0.28	ND	ND
1-Me-Pyrene	0.09	0.16	0.02	0.12	0.08	0.11
Benzo(g,h,i)Fluoranthene	0.33	0.08	0.13	0.19	0.27	0.19
Benzo(a)Anthracene	ND	ND	0.08	ND	0.57	ND
Chrysene&Triphenylene	0.50	0.06	0.33	0.07	1.15	0.25
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	2.28	0.08	0.86	0.02	2.98	0.04
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.46	ND	0.22	ND	0.76	ND
Benzo(a)Pyrene	0.35	ND	0.14	ND	0.50	ND
Perylene	0.08	ND	0.02	ND	0.13	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.60	ND	0.29	ND	0.86	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.44	ND	0.25	ND	0.69	ND
Anthanthrene	ND	ND	ND	ND	0.04	ND
TOTAL PAH	8.07	48.52	3.77	42.77	10.81	58.30
RECOVERY (%)						
*AE	19	84	27	85	8	98
*AN	66	91	57	80	69	88
*PY	90	96	69	89	89	86
*B(a)A	86	89	68	84	85	81
*B(a)P	75	75	55	72	70	71
*D(ah)A	83	93	63	80	81	76
*B(ghi)P	90	87	59	77	77	77
Perf. STD	101	108	103	101	99	98
SAMPLE DATE	15-Apr-88	15-Apr-88	21-Apr-88	21-Apr-88	27-Apr-88	27-Apr-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	636	636	829	829	845	845
TSP (μg/m³)	79.4		61.1		52.2	
SAMPLE ID	*WW-113	*WW-114	WW-115	WW-116	WW-119	WW-120

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	3-May-88	3-May-88	9-May-88	9-May-88	15-May-88	15-May-88
Acenaphthylene	ND	0.68	0.03	7.30	0.01	0.49
Acenaphthene	0.02	1.12	0.05	56.14	0.07	1.59
Fluorene	ND	2.43	0.08	30.66	0.05	3.90
2-Me-Fluorene	0.21	5.25	0.08	10.07	0.15	2.59
Phenanthrene	0.61	15.71	1.48	135.49	0.52	36.89
Anthracene	ND	0.73	0.35	13.56	0.09	ND
Fluoranthene	0.54	2.99	2.96	36.06	0.44	9.98
Pyrene	0.36	1.63	1.98	20.01	0.30	4.46
Benzo(a)Fluorene	0.07	0.23	1.18	2.25	0.06	0.84
Benzo(b)Fluorene	ND	0.09	0.99	1.82	0.04	0.42
1-Me-Pyrene	0.02	0.06	0.22	0.34	0.01	0.15
Benzo(g,h,i)Fluoranthene	0.09	0.14	0.69	0.40	0.05	0.36
Benzo(a)Anthracene	0.12	0.02	2.91	0.74	0.19	0.35
Chrysene&Triphenylene	0.30	0.13	4.66	0.81	0.26	0.68
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	1.00	0.02	6.02	0.67	1.32	ND
Benzo(k)Fluoranthene	ND	ND	1.85	ND	ND	ND
Benzo(e)Pyrene	0.24	ND	2.32	0.15	0.35	ND
Benzo(a)Pyrene	0.17	ND	1.73	0.15	0.19	ND
Perylene	0.03	ND	0.32	ND	0.02	ND
2-Me-Cholanthrene	ND	ND	0.05	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.28	ND	1.93	0.12	0.37	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	0.44	0.03	0.07	ND
Benzo(b)Chrysene	ND	ND	0.22	ND	0.02	ND
Benzo(g,h,i)Perylene	0.22	ND	1.19	0.08	0.26	ND
Anthanthrene	ND	ND	0.10	ND	ND	ND
TOTAL PAH	4.30	31.24	33.85	316.85	4.84	62.71
RECOVERY (%)						
*AE	31	81	37	90	14	52
*AN	75	77	65	74	68	73
*PY	90	84	74	77	82	80
*B(a)A	76	77	66	69	77	86
*B(a)P	63	66	55	61	63	72
*D(ah)A	71	73	66	67	76	77
*B(ghi)P	67	73	64	66	72	72
Perf. STD	100	99	84	97	96	90
SAMPLE DATE	3-May-88	3-May-88	9-May-88	9-May-88	15-May-88	15-May-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUFS/XAD	FILTER	PUF
SAMPLE VOLUME (m³)	859	859	595	595	810	810
TSP (μg/m³)	83.5		124.3		83.5	
SAMPLE ID	WW-121	WW-122	*WW-125	*WW-126	WW-127	WW-128

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	21-May-88	21-May-88	2-Jun-88	2-Jun-88	8-Jun-88	8-Jun-88
Acenaphthylene	ND	3.15	ND	0.36	ND	0.43
Acenaphthene	ND	20.26	ND	0.60	ND	1.27
Fluorene	ND	17.24	ND	1.26	ND	2.94
2-Me-Fluorene	0.17	6.00	ND	4.10	ND	4.25
Phenanthrene	0.63	65.94	0.22	9.73	0.29	16.45
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	0.83	14.72	0.31	1.62	0.66	3.16
Pyrene	0.60	7.72	0.22	0.84	0.41	1.73
Benzo(a)Fluorene	0.13	1.19	0.03	0.10	0.08	0.18
Benzo(b)Fluorene	0.07	ND	0.01	0.08	0.04	0.06
1-Me-Pyrene	0.03	0.30	0.01	0.05	ND	0.06
Benzo(g,h,i)Fluoranthene	0.10	0.50	0.03	0.06	0.06	0.10
Benzo(a)Anthracene	0.27	0.27	0.07	0.10	0.18	ND
Chrysene&Triphenylene	0.60	1.56	0.17	ND	0.33	0.10
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	2.49	0.23	0.50	ND	0.80	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.66	ND	0.15	ND	0.25	ND
Benzo(a)Pyrene	0.46	ND	0.12	ND	0.23	ND
Perylene	0.07	ND	ND	ND	0.04	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.66	ND	0.16	ND	0.23	ND
Dibenzo(a,c)&(a,h)Anthracen	0.17	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.60	ND	0.13	ND	0.21	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	8.52	139.07	2.15	18.91	3.80	30.75
RECOVERY (%)						
*AE	32	123	35	50	23	61
*AN	75	84	75	44	67	74
*PY	86	88	92	50	95	80
*B(a)A	79	81	97	43	93	72
*B(a)P	67	71	125	35	120	92
*D(ah)A	78	73	99	41	90	58
*B(ghi)P	77	76	107	42	101	67
Perf. STD	98	102	107	56	104	87
SAMPLE DATE	21-May-88	21-May-88	2-Jun-88	2-Jun-88	8-Jun-88	8-Jun-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUF	FILTER	PUF
SAMPLE VOLUME (m³)	603	603	862	862	487	487
TSP (μg/m³)	107.6		71.9		101.1	
SAMPLE ID	*WW-129	*WW-130	WW-131	WW-132	WW-133	WW-134

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	20-Jun-88	20-Jun-88	26-Jun-88	26-Jun-88	2-Jul-88	2-Jul-88
Acenaphthylene	0.02	0.18	ND	0.82	ND	0.69
Acenaphthene	0.02	0.94	0.03	3.79	0.04	1.20
Fluorene	0.04	1.99	0.01	3.38	0.03	2.23
2-Me-Fluorene	ND	2.14	0.03	3.30	ND	3.39
Phenanthrene	1.01	38.36	0.62	18.81	1.39	37.16
Anthracene	ND	ND	0.12	0.32	ND	ND
Fluoranthene	1.35	13.18	1.32	3.89	2.24	7.20
Pyrene	1.02	5.90	0.94	2.03	1.61	3.80
Benzo(a)Fluorene	0.26	0.85	0.22	0.25	0.34	0.53
Benzo(b)Fluorene	0.29	0.44	0.07	0.10	0.08	0.22
1-Me-Pyrene	ND	0.27	0.07	0.07	ND	0.17
Benzo(g,h,i)Fluoranthene	0.18	ND	0.14	0.14	0.27	0.29
Benzo(a)Anthracene	0.63	0.32	0.67	0.04	0.87	0.11
Chrysene&Triphenylene	1.11	1.41	0.65	0.20	1.22	0.42
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	3.83	0.45	2.08	ND	4.05	0.06
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	1.01	0.09	0.51	ND	0.97	ND
Benzo(a)Pyrene	1.07	ND	0.64	ND	1.04	ND
Perylene	0.18	ND	0.12	ND	0.14	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	1.30	ND	0.58	ND	1.06	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	0.13	ND	ND	ND
Benzo(b)Chrysene	0.12	ND	0.07	ND	0.13	ND
Benzo(g,h,i)Perylene	0.87	ND	0.42	ND	0.81	ND
Anthanthrene	0.07	ND	0.03	ND	0.03	ND
TOTAL PAH	14.37	66.53	9.46	37.15	16.30	57.46
RECOVERY (%)						
*AE	27	81	4	90	14	70
*AN	71	74	43	85	43	73
*PY	93	76	73	108	93	76
*B(a)A	91	70	74	129	91	67
*B(a)P	86	78	72	130	83	74
*D(ah)A	101	49	75	152	101	44
*B(ghi)P	95	57	76	150	95	51
Perf. STD	102	80	110	129	98	83
SAMPLE DATE	20-Jun-88	20-Jun-88	26-Jun-88	26-Jun-88	2-Jul-88	2-Jul-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUFS/XAD	FILTER	PUF
SAMPLE VOLUME (m³)	901	901	691	691	714	714
TSP (μg/m³)	147.5		62.9		102.4	
SAMPLE ID	WW-139	WW-140	WW-143	WW-144	WW-145	WW-146

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	8-Jul-88	8-Jul-88	14-Jul-88	14-Jul-88	20-Jul-88	20-Jul-88
Acenaphthylene	ND	1.13	ND	0.32	ND	2.11
Acenaphthene	0.01	14.59	0.01	1.11	ND	6.25
Fluorene	0.01	11.69	0.03	2.24	ND	4.86
2-Me-Fluorene	ND	8.15	ND	2.90	0.03	3.95
Phenanthrene	0.32	60.97	0.87	61.90	0.12	26.95
Anthracene	0.08	ND	ND	5.22	ND	ND
Fluoranthene	0.77	12.02	1.47	28.25	0.25	5.04
Pyrene	0.56	5.62	1.14	15.45	0.17	2.88
Benzo(a)Fluorene	0.11	0.70	0.35	2.71	0.05	0.34
Benzo(b)Fluorene	0.06	0.29	ND	2.12	0.02	0.14
1-Me-Pyrene	0.04	0.17	ND	0.55	0.02	0.14
Benzo(g,h,i)Fluoranthene	0.10	0.34	0.25	0.87	0.06	0.20
Benzo(a)Anthracene	0.27	0.08	0.91	1.64	0.09	0.06
Chrysene&Triphenylene	0.50	0.42	1.44	3.61	0.18	0.21
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	1.25	ND	5.67	1.99	0.61	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.39	ND	1.50	0.42	0.20	ND
Benzo(a)Pyrene	0.42	ND	1.38	ND	0.12	ND
Perylene	0.07	ND	0.22	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.46	ND	1.60	ND	0.23	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.39	ND	1.18	ND	0.29	ND
Anthanthrene	ND	ND	0.09	ND	ND	ND
TOTAL PAH	5.83	116.17	18.10	131.29	2.44	53.14
RECOVERY (%)						
*AE	15	147	5	77	-	118
*AN	48	72	55	82	21	69
*PY	97	83	105	86	82	75
*B(a)A	102	85	104	85	78	81
*B(a)P	106	79	99	71	76	76
*D(ah)A	113	80	119	76	81	83
*B(ghi)P	109	82	112	77	85	82
Perf. STD	111	102	109	100	98	92
SAMPLE DATE	8-Jul-88	8-Jul-88	14-Jul-88	14-Jul-88	20-Jul-88	20-Jul-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUF	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	714	714	693	693	653	653
TSP (μg/m³)	162.7		109.9		48.9	
SAMPLE ID	WW-147	WW-148	WW-151	WW-152	WW-155	WW-156

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	26-Jul-88	26-Jul-88	7-Aug-88	7-Aug-88	13-Aug-88	13-Aug-88
Acenaphthylene	ND	0.13	ND	0.08	ND	1.91
Acenaphthene	ND	0.68	ND	0.38	ND	1.08
Fluorene	0.01	1.51	ND	1.46	ND	13.02
2-Me-Fluorene	ND	5.13	ND	ND	0.07	4.40
Phenanthrene	0.43	36.51	0.08	34.56	0.33	60.53
Anthracene	ND	ND	ND	ND	0.07	ND
Fluoranthene	1.07	9.07	0.16	7.14	0.72	18.08
Pyrene	0.77	4.01	0.11	3.17	0.51	8.73
Benzo(a)Fluorene	0.19	ND	0.01	0.34	0.20	1.52
Benzo(b)Fluorene	0.07	ND	ND	0.10	0.11	0.72
1-Me-Pyrene	ND	ND	ND	ND	0.05	0.34
Benzo(g,h,i)Fluoranthene	0.17	0.25	ND	0.19	0.13	0.47
Benzo(a)Anthracene	0.29	ND	ND	ND	0.39	0.80
Chrysene&Triphenylene	0.64	0.29	0.07	0.26	0.70	1.85
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	2.03	ND	0.26	ND	2.22	0.90
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.54	ND	0.07	ND	0.59	0.20
Benzo(a)Pyrene	0.40	ND	0.07	ND	0.56	ND
Perylene	0.06	ND	ND	ND	0.08	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.53	ND	0.08	ND	0.60	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.54	ND	0.07	ND	0.49	ND
Anthanthrene	ND	ND	ND	ND	0.05	ND
TOTAL PAH	7.72	57.59	0.98	47.69	7.86	114.55
RECOVERY (%)						
*AE	8	52	-	55	38	94
*AN	57	47	43	66	52	55
*PY	103	54	78	74	86	70
*B(a)A	100	50	76	72	84	72
*B(a)P	92	45	66	63	75	58
*D(ah)A	97	51	78	70	84	62
*B(ghi)P	101	51	79	70	84	66
Perf. STD	124	101	87	133	103	97
SAMPLE DATE	26-Jul-88	26-Jul-88	7-Aug-88	7-Aug-88	13-Aug-88	13-Aug-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUF	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	834	834	731	731	612	612
TSP (μg/m³)	71.5		57.0		113.3	
SAMPLE ID	WW-157	WW-158	WW-161	WW-162	WW-165	WW-166

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	19-Aug-88	19-Aug-88	25-Aug-88	25-Aug-88	31-Aug-88	31-Aug-88
Acenaphthylene	ND	1.96	ND	7.28	ND	0.75
Acenaphthene	ND	2.03	0.01	3.09	ND	0.28
Fluorene	ND	2.84	0.03	18.21	0.03	3.34
2-Me-Fluorene	ND	6.30	0.05	10.87	0.04	4.58
Phenanthrene	0.16	23.39	0.58	105.82	0.37	51.70
Anthracene	ND	1.71	0.26	ND	0.13	10.81
Fluoranthene	0.28	6.13	1.26	24.71	0.66	16.88
Pyrene	0.20	3.84	0.93	14.49	0.46	10.12
Benzo(a)Fluorene	0.05	0.51	0.32	5.59	0.14	2.27
Benzo(b)Fluorene	0.03	0.28	ND	4.04	0.09	1.81
1-Me-Pyrene	0.02	0.16	0.09	0.76	0.04	0.47
Benzo(g,h,i)Fluoranthene	0.08	0.36	0.23	0.88	0.12	0.79
Benzo(a)Anthracene	0.12	0.56	0.81	1.75	0.32	1.49
Chrysene&Triphenylene	0.21	0.94	1.52	3.73	0.79	2.79
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.66	1.98	6.77	0.42	3.35	0.21
Benzo(k)Fluoranthene	ND	ND	0.23	ND	ND	ND
Benzo(e)Pyrene	0.23	0.56	1.65	ND	0.79	0.03
Benzo(a)Pyrene	0.18	0.66	1.09	ND	0.42	ND
Perylene	0.05	0.13	0.18	ND	0.08	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.21	0.58	1.70	ND	0.63	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	0.50	ND	ND	ND
Benzo(b)Chrysene	ND	0.07	0.12	ND	ND	ND
Benzo(g,h,i)Perylene	0.26	0.43	1.13	ND	0.51	ND
Anthanthrene	ND	0.03	0.08	ND	0.03	ND
TOTAL PAH	2.75	55.46	19.56	201.64	8.99	108.31
RECOVERY (%)						
*AE	10	107	25	69	20	103
*AN	54	85	66	97	55	79
*PY	99	96	95	113	83	93
*B(a)A	92	92	92	113	79	90
*B(a)P	85	82	89	98	68	81
*D(ah)A	91	91	100	97	80	81
*B(ghi)P	95	92	90	100	76	86
Perf. STD	106	105	98	88	93	98
SAMPLE DATE	19-Aug-88	19-Aug-88	25-Aug-88	25-Aug-88	31-Aug-88	31-Aug-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUFS/XAD	FILTER	PUF
SAMPLE VOLUME (m³)	607	607	988	988	761	761
TSP (μg/m³)	52.6		77.8		107.0	
SAMPLE ID	WW-167	WW-168	WW-175	WW-176	WW-181	WW-182

Table C7: PAH Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	12-Sep-88	12-Sep-88
Acenaphthylene	ND	1.22
Acenaphthene	ND	1.44
Fluorene	ND	3.07
2-Me-Fluorene	ND	7.03
Phenanthrene	0.24	44.73
Anthracene	ND	ND
Fluoranthene	0.46	7.21
Pyrene	0.34	4.09
Benzo(a)Fluorene	0.12	0.63
Benzo(b)Fluorene	0.04	0.22
1-Me-Pyrene	0.04	0.26
Benzo(g,h,i)Fluoranthene	0.07	0.32
Benzo(a)Anthracene	0.22	0.12
Chrysene&Triphenylene	0.40	0.49
7-Me-Benzo(a)Anthracene	ND	ND
Benzo(b)Fluoranthene	1.43	0.12
Benzo(k)Fluoranthene	ND	ND
Benzo(e)Pyrene	0.34	ND
Benzo(a)Pyrene	0.29	ND
Perylene	0.06	ND
2-Me-Cholanthrene	ND	ND
Indeno(1,2,3-cd)Pyrene	0.38	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND
Benzo(b)Chrysene	ND	ND
Benzo(g,h,i)Perylene	0.29	ND
Anthanthrene	ND	ND
TOTAL PAH	4.72	70.95
RECOVERY (%)		
*AE	56	ND
*AN	78	103
*PY	97	105
*B(a)A	92	105
*B(a)P	90	97
*D(ah)A	97	99
*B(ghi)P	99	101
Perf. STD	108	116
SAMPLE DATE	12-Sep-88	12-Sep-88
SAMPLE TYPE	FILTER	PUF
SAMPLE VOLUME (m³)	680	680
TSP (μg/m³)	95.2	
SAMPLE ID	WW-183	WW-184

Table C8: FAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	22-Jan-88	22-Jan-88	9-Feb-88	9-Feb-88	21-Feb-88	21-Feb-88
Acenaphthylene	ND	0.41	ND	0.44	ND	0.09
Acenaphthene	ND	0.88	ND	1.00	ND	0.35
Fluorene	ND	1.13	ND	1.51	ND	0.53
2-Me-Fluorene	ND	0.79	ND	1.17	ND	0.26
Phenanthrene	ND	3.59	0.29	4.29	0.19	1.62
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	0.85	0.63	0.96	0.34	0.35
Pyrene	ND	0.38	0.38	0.31	0.20	0.15
Benzo(a)Fluorene	ND	ND	0.13	ND	0.05	ND
Benzo(b)Fluorene	ND	ND	ND	ND	0.02	ND
1-Me-Pyrene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Fluoranthene	ND	ND	0.23	ND	0.07	ND
Benzo(a)Anthracene	ND	ND	0.17	ND	0.07	ND
Chrysene&Triphenylene	0.13	ND	0.54	0.08	0.19	ND
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.28	ND	0.79	ND	0.28	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.06	ND	0.23	ND	0.08	ND
Benzo(a)Pyrene	ND	ND	0.15	ND	0.07	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	0.25	ND	0.07	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	0.21	ND	0.07	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	0.47	8.03	4.00	9.77	1.70	3.35
RECOVERY (%)						
*AE	-	69	14	66	13	52
*AN	12	79	57	59	44	52
*PY	54	95	82	66	60	60
*B(a)A	82	96	80	68	61	60
*B(a)P	76	87	64	55	54	54
*D(ah)A	86	89	78	63	60	62
*B(ghi)P	87	95	80	62	60	63
Perf. STD	92	111	125	81	78	75
SAMPLE DATE	22-Jan-88	22-Jan-88	9-Feb-88	9-Feb-88	21-Feb-88	21-Feb-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS
SAMPLE VOLUME (m³)	635	635	478	478	1076	1076
TSP (μg/m³)	19.4	ND	30.5	ND	19.7	ND
SAMPLE ID	*WAL-1	*WAL-2	*WAL-5	WAL-6	*WAL-9	WAL-10

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	27-Feb-88	27-Feb-88	10-Mar-88	10-Mar-88	16-Mar-88	16-Mar-88
Acenaphthylene	ND	0.17	ND	0.14	ND	0.05
Acenaphthene	ND	0.33	ND	0.25	ND	0.17
Fluorene	ND	0.40	ND	0.40	ND	0.39
2-Me-Fluorene	ND	0.28	ND	0.54	ND	0.36
Phenanthrene	0.01	1.08	ND	1.30	0.06	1.64
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	0.04	0.24	0.07	0.22	0.11	0.38
Pyrene	0.02	0.08	ND	0.14	0.07	0.13
Benzo(a)Fluorene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluorene	ND	ND	ND	ND	ND	ND
1-Me-Pyrene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Fluoranthene	0.01	ND	ND	ND	0.04	ND
Benzo(a)Anthracene	0.01	ND	ND	ND	0.02	ND
Chrysene&Triphenylene	0.03	ND	ND	ND	0.10	ND
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.07	ND	ND	ND	0.20	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.02	ND	ND	ND	0.06	ND
Benzo(a)Pyrene	0.01	ND	ND	ND	0.04	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.02	ND	ND	ND	0.06	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.01	ND	ND	ND	0.06	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	0.27	2.57	0.07	2.99	0.81	3.12
RECOVERY (%)						
*AE	-	64	-	46	13	50
*AN	18	83	12	74	63	66
*PY	65	93	69	84	88	73
*B(a)A	81	89	87	80	79	64
*B(a)P	75	81	77	76	66	59
*D(ah)A	82	86	90	74	70	60
*B(ghi)P	83	88	89	78	78	66
Perf. STD	104	114	100	114	114	103
SAMPLE DATE	27-Feb-88	27-Feb-88	10-Mar-88	10-Mar-88	16-Mar-88	16-Mar-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	
SAMPLE VOLUME (m³)	2020	2020	556	556	840	840
TSP (μg/m³)	59.3	ND	12.8	ND	8.0	ND
SAMPLE ID	*WAL-13	*WAL-14	*WAL-15	*WAL-16	*WAL-19	WAL-20

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	22-Mar-88	22-Mar-88	28-Mar-88	28-Mar-88	3-Apr-88	3-Apr-88
Acenaphthylene	ND	0.09	ND	0.13	ND	0.05
Acenaphthene	ND	0.15	ND	0.16	ND	0.33
Fluorene	ND	0.45	ND	0.61	ND	0.87
2-Me-Fluorene	ND	0.45	ND	0.61	ND	0.79
Phenanthrene	0.19	1.40	0.06	1.88	0.15	2.52
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	0.27	0.42	0.11	0.50	0.21	0.58
Pyrene	0.17	0.19	0.08	0.24	0.15	0.18
Benzo(a)Fluorene	0.03	0.02	0.02	0.05	0.05	0.03
Benzo(b)Fluorene	0.02	ND	ND	0.05	ND	0.02
1-Me-Pyrene	0.01	ND	ND	ND	ND	ND
Benzo(g,h,i)Fluoranthene	0.06	ND	0.04	0.02	0.03	ND
Benzo(a)Anthracene	0.05	ND	0.04	ND	ND	ND
Chrysene&Triphenylene	0.19	ND	0.12	0.02	0.13	0.05
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.36	ND	0.27	ND	0.46	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.09	ND	0.07	ND	0.10	ND
Benzo(a)Pyrene	0.08	ND	0.06	ND	0.10	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.09	ND	0.08	ND	0.12	ND
Dibenzo(a,c)&(a,h)Anthracen	0.02	ND	0.02	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.08	ND	0.07	ND	0.07	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	1.72	3.18	1.05	4.27	1.56	5.41
RECOVERY (%)						
*AE	28	61	3	57	33	58
*AN	77	77	53	64	61	85
*PY	95	87	77	69	78	93
*B(a)A	101	89	79	70	73	90
*B(a)P	87	75	72	61	66	79
*D(ah)A	100	91	78	65	71	86
*B(ghi)P	98	88	75	66	71	87
Perf. STD	107	101	85	80	75	102
SAMPLE DATE	22-Mar-88	22-Mar-88	28-Mar-88	28-Mar-88	3-Apr-88	3-Apr-88
SAMPLE TYPE	FILTER	PUFS	FILTER	PUFS	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	859	859	825	825	608	608
TSP (μg/m³)	59.7	ND	142.2	ND	39.5	ND
SAMPLE ID	WAL-21	WAL-22	WAL-25	WAL-26	*WAL-27	*WAL-28

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	9-Apr-88	9-Apr-88	15-Apr-88	15-Apr-88	3-May-88	3-May-88
Acenaphthylene	ND	4.01	ND	0.05	ND	0.06
Acenaphthene	ND	0.91	ND	0.16	ND	0.16
Fluorene	ND	1.80	ND	0.30	ND	0.48
2-Me-Fluorene	ND	1.51	ND	0.30	ND	0.65
Phenanthrene	0.04	9.55	0.04	1.10	0.05	1.62
Anthracene	ND	2.01	ND	ND	ND	ND
Fluoranthene	0.12	3.51	0.08	0.28	0.25	0.58
Pyrene	0.12	2.72	0.05	0.14	0.17	0.21
Benzo(a)Fluorene	0.16	0.38	0.01	0.03	0.04	ND
Benzo(b)Fluorene	0.08	0.21	ND	ND	0.02	0.01
1-Me-Pyrene	0.06	0.13	ND	ND	0.01	ND
Benzo(g,h,i)Fluoranthene	0.40	0.08	0.03	0.01	0.04	0.01
Benzo(a)Anthracene	0.25	0.01	0.01	ND	0.06	ND
Chrysene&Triphenylene	0.70	0.03	0.05	ND	0.19	0.05
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	1.27	ND	0.12	ND	0.51	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.31	ND	0.04	ND	0.13	ND
Benzo(a)Pyrene	0.19	ND	0.03	ND	0.10	ND
Perylene	0.04	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.40	ND	0.03	ND	0.12	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.28	ND	0.03	ND	0.08	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	4.41	26.83	0.51	2.37	1.77	3.82
RECOVERY (%)						
*AE	23	82	15	57	4	63
*AN	68	85	69	64	45	68
*PY	85	89	92	70	63	76
*B(a)A	88	89	92	64	63	70
*B(a)P	76	77	82	56	51	53
*D(ah)A	84	83	86	56	55	62
*B(ghi)P	80	82	86	58	56	65
Perf. STD	98	101	102	80	76	94
SAMPLE DATE	9-Apr-88	9-Apr-88	15-Apr-88	15-Apr-88	3-May-88	3-May-88
SAMPLE TYPE	FILTER	PUFS	FILTER	PUFS	FILTER	PUFS
SAMPLE VOLUME (m³)	773	773	772	772	829	829
TSP (μg/m³)	28.7	ND	157.7	ND	82.9	ND
SAMPLE ID	WAL-31	WAL-32	WAL-33	WAL-34	WAL-39	WAL-40

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	9-May-88	9-May-88	15-May-88	15-May-88	21-May-88	21-May-88
Acenaphthylene	ND	0.01	ND	0.01	ND	0.29
Acenaphthene	ND	0.49	ND	0.09	ND	1.72
Fluorene	ND	0.83	ND	0.42	ND	4.01
2-Me-Fluorene	ND	1.54	ND	1.18	ND	1.90
Phenanthrene	0.04	4.39	0.08	2.65	0.26	9.95
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	0.07	1.02	0.18	0.62	0.42	1.96
Pyrene	0.05	0.58	0.12	0.22	0.26	0.64
Benzo(a)Fluorene	0.02	0.06	0.03	0.05	0.07	0.11
Benzo(b)Fluorene	0.01	0.04	0.03	0.03	ND	0.04
1-Me-Pyrene	ND	0.02	ND	ND	ND	ND
Benzo(g,h,i)Fluoranthene	0.01	0.05	0.03	0.03	0.04	0.04
Benzo(a)Anthracene	0.04	ND	0.05	0.01	ND	ND
Chrysene&Triphenylene	0.11	0.07	0.12	0.09	0.29	0.20
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.20	0.01	0.33	0.03	0.88	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.06	ND	0.09	ND	0.20	ND
Benzo(a)Pyrene	0.05	ND	0.09	ND	0.18	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.06	ND	0.12	ND	ND	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.05	ND	0.08	ND	0.15	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	0.76	9.10	1.32	5.42	2.76	20.86
RECOVERY (%)						
*AE	2	58	13	62	23	73
*AN	51	78	60	70	62	79
*PY	82	88	76	77	78	83
*B(a)A	77	86	74	71	78	80
*B(a)P	68	73	66	60	73	68
*D(ah)A	72	81	70	67	79	80
*B(ghi)P	73	82	69	68	77	78
Perf. STD	98	99	88	85	80	90
SAMPLE DATE	9-May-88	9-May-88	15-May-88	15-May-88	21-May-88	21-May-88
SAMPLE TYPE	FILTER	PUFS	FILTER	PUFS	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	845	845	780	780	453	453
TSP (μg/m³)	171.4	ND	83.3	ND	111.6	ND
SAMPLE ID	WAL-41	WAL-42	WAL-45	WAL-46	*WAL-47	*WAL-48

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	27-May-88	27-May-88	2-Jun-88	2-Jun-88	20-Jun-88	20-Jun-88
Acenaphthylene	ND	0.01	ND	0.03	ND	0.01
Acenaphthene	ND	ND	ND	0.16	ND	0.12
Fluorene	ND	0.60	ND	0.36	ND	0.29
2-Me-Fluorene	ND	0.83	ND	1.09	ND	0.50
Phenanthrene	0.16	3.08	0.04	1.12	0.10	3.23
Anthracene	ND	ND	ND	ND	0.03	ND
Fluoranthene	0.42	0.72	0.07	0.20	0.28	0.57
Pyrene	0.27	0.23	0.04	0.11	0.21	0.18
Benzo(a)Fluorene	0.04	0.03	ND	0.01	0.04	0.03
Benzo(b)Fluorene	0.03	ND	ND	ND	0.01	ND
1-Me-Pyrene	0.01	ND	ND	ND	ND	0.01
Benzo(g,h,i)Fluoranthene	0.04	0.03	ND	ND	0.04	ND
Benzo(a)Anthracene	0.05	ND	ND	ND	0.07	ND
Chrysene&Triphenylene	0.20	0.04	0.03	ND	0.18	0.06
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.39	ND	0.09	ND	0.47	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.11	ND	0.03	ND	0.13	ND
Benzo(a)Pyrene	0.11	ND	ND	ND	0.15	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.11	ND	ND	ND	0.12	ND
Dibenzo(a,c)&(a,h)Anthracen	0.03	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.10	ND	ND	ND	0.10	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	2.08	5.57	0.30	3.09	1.94	5.00
RECOVERY (%)						
*AE	4	58	4	69	5	76
*AN	60	68	61	63	36	72
*PY	88	74	81	82	97	82
*B(a)A	92	69	78	73	99	76
*B(a)P	78	58	99	89	90	86
*D(ah)A	87	65	67	62	105	69
*B(ghi)P	87	66	74	70	105	78
Perf. STD	99	83	93	94	106	89
SAMPLE DATE	27-May-88	27-May-88	2-Jun-88	2-Jun-88	20-Jun-88	20-Jun-88
SAMPLE TYPE	FILTER	PUFS	FILTER	PUFS	FILTER	PUFS
SAMPLE VOLUME (m³)	735	735	741	741	682	682
TSP (μg/m³)	95.2	ND	163.2	ND	169.6	ND
SAMPLE ID	WAL-51	WAL-52	WAL-53	WAL-54	WAL-57	WAL-58

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	26-Jun-88	26-Jun-88	2-Jul-88	2-Jul-88	8-Jul-88	8-Jul-88
Acenaphthylene	ND	0.16	ND	ND	ND	ND
Acenaphthene	ND	0.71	ND	0.06	ND	ND
Fluorene	ND	0.75	ND	0.28	ND	1.95
2-Me-Fluorene	ND	0.83	ND	ND	ND	1.67
Phenanthrene	ND	2.77	0.08	3.09	0.06	3.05
Anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	0.05	0.43	0.19	0.40	0.13	0.44
Pyrene	0.05	0.24	0.12	0.24	0.09	0.22
Benzo(a)Fluorene	ND	0.03	0.03	ND	ND	0.04
Benzo(b)Fluorene	ND	ND	ND	ND	ND	ND
1-Me-Pyrene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Fluoranthene	ND	ND	0.01	ND	ND	ND
Benzo(a)Anthracene	ND	ND	0.03	ND	0.06	ND
Chrysene&Triphenylene	0.03	0.03	0.10	ND	0.11	0.06
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.09	ND	0.28	ND	0.18	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.03	ND	0.08	ND	0.06	ND
Benzo(a)Pyrene	ND	ND	0.06	ND	0.06	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	0.07	ND	ND	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	0.06	ND	ND	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	0.26	5.97	1.11	4.06	0.73	7.41
RECOVERY (%)						
*AE	11	107	4	39	6	89
*AN	51	57	65	71	35	68
*PY	81	114	104	95	87	89
*B(a)A	78	109	106	89	95	86
*B(a)P	71	101	141	75	88	75
*D(ah)A	73	109	105	86	95	82
*B(ghi)P	76	114	115	90	95	87
Perf. STD	103	142	116	104	99	99
SAMPLE DATE	26-Jun-88	26-Jun-88	2-Jul-88	2-Jul-88	8-Jul-88	8-Jul-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	575	575	722	722	545	545
TSP (μg/m³)	62.3	ND	83.3	ND	98.7	ND
SAMPLE ID	WAL-59	WAL-60	WAL-63	WAL-64	WAL-67	WAL-68

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	14-Jul-88	14-Jul-88	20-Jul-88	20-Jul-88	26-Jul-88	26-Jul-88
Acenaphthylene	ND	0.02	ND	0.18	ND	0.06
Acenaphthene	ND	0.18	ND	0.82	ND	0.11
Fluorene	ND	0.33	ND	0.89	ND	0.17
2-Me-Fluorene	ND	0.62	ND	1.02	ND	0.66
Phenanthrene	0.08	5.70	ND	3.31	ND	1.86
Anthracene	0.03	0.10	ND	ND	ND	ND
Fluoranthene	0.23	1.07	ND	0.42	ND	0.29
Pyrene	0.17	0.38	ND	0.22	ND	0.14
Benzo(a)Fluorene	0.03	ND	ND	0.07	ND	0.01
Benzo(b)Fluorene	0.02	0.03	ND	ND	ND	ND
1-Me-Pyrene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Fluoranthene	0.03	0.02	ND	ND	ND	ND
Benzo(a)Anthracene	0.08	ND	ND	ND	ND	ND
Chrysene&Triphenylene	0.17	0.07	0.04	ND	ND	ND
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.43	ND	0.11	ND	ND	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)Pyrene	0.12	ND	ND	ND	ND	ND
Benzo(a)Pyrene	0.13	ND	ND	ND	ND	ND
Perylene	ND	ND	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND	ND	ND	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)Perylene	0.10	ND	ND	ND	ND	ND
Anthanthrene	ND	ND	ND	ND	ND	ND
TOTAL PAH	1.63	8.51	0.16	6.93	ND	3.31
RECOVERY (%)						
*AE	19	53	30	74	4	39
*AN	67	69	67	58	29	33
*PY	93	87	88	80	88	42
*B(a)A	97	86	85	73	83	35
*B(a)P	132	103	78	65	76	28
*D(ah)A	95	79	82	63	83	32
*B(ghi)P	104	89	85	67	88	34
Perf. STD	103	100	106	90	97	120
SAMPLE DATE	14-Jul-88	14-Jul-88	20-Jul-88	20-Jul-88	26-Jul-88	26-Jul-88
SAMPLE TYPE	FILTER	PUF	FILTER	PUFS/XAD	FILTER	PUFS
SAMPLE VOLUME (m³)	600	600	450	450	697	697
TSP (µg/m³)	244.7	ND	68.8	ND	205.1	ND
SAMPLE ID	WAL-69	WAL-70	WAL-71	WAL-72	WAL-75	WAL-76

Table C8: PAH Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	1-Aug-88	1-Aug-88	7-Aug-88	7-Aug-88
Acenaphthylene	ND	0.09	ND	0.03
Acenaphthene	ND	ND	ND	0.31
Fluorene	ND	1.87	ND	0.42
2-Me-Fluorene	ND	1.68	ND	0.81
Phenanthrene	0.07	4.57	ND	4.58
Anthracene	ND	ND	ND	ND
Fluoranthene	0.12	0.62	ND	0.76
Pyrene	0.09	0.28	ND	0.42
Benzo(a)Fluorene	0.02	0.05	ND	0.06
Benzo(b)Fluorene	ND	ND	ND	ND
1-Me-Pyrene	ND	ND	ND	0.06
Benzo(g,h,i)Fluoranthene	ND	ND	ND	ND
Benzo(a)Anthracene	ND	ND	ND	0.11
Chrysene&Triphenylene	0.09	ND	ND	ND
7-Me-Benzo(a)Anthracene	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.18	ND	ND	ND
Benzo(k)Fluoranthene	ND	ND	ND	ND
Benzo(e)Pyrene	0.05	ND	ND	ND
Benzo(a)Pyrene	ND	ND	ND	ND
Perylene	ND	ND	ND	ND
2-Me-Cholanthrene	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND	ND
Dibenzo(a,c)&(a,h)Anthracen	ND	ND	ND	ND
Benzo(b)Chrysene	ND	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND	ND
Anthanthrene	ND	ND	ND	ND
TOTAL PAH	0.62	9.16	ND	7.56
RECOVERY (%)				
*AE	8	78	5	78
*AN	60	52	37	58
*PY	81	72	58	82
*B(a)A	72	64	53	74
*B(a)P	65	58	46	62
*D(ah)A	60	54	49	70
*B(ghi)P	66	60	52	73
Perf. STD	95	87	116	94
SAMPLE DATE	1-Aug-88	1-Aug-88	7-Aug-88	7-Aug-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS
SAMPLE VOLUME (m³)	434	434	645	645
TSP (µg/m³)	79.3	ND	43.1	ND
SAMPLE ID	WAL-79	WAL-80	WAL-83	WAL-84

APPENDIX D

Polychlorinated Biphenyls, Chlorinated Benzenes and Chlorinated Phenols

Sampling

Sampling was carried out using a modified hi-vol sampler as outlined in Appendix C. A polyurethane foam / XAD adsorbent trap was used for all samples. Total sample volumes for 24 h were approximately 650 m^3.

Analysis

For most samples, separate analytical determinations were made of particulate (filter retained) and vapor (adsorbent retained) fractions. Mean concentrations by phase are shown in *Table D1*.

Mean detection levels for PCB were 0.03 to 0.06 ng/m^3; mean detection levels for CB and CP were 0.03 ng/m^3. A description of the analytical methodology is included in Appendix C. Mean recovery results for spiked surrogate compounds are given in *Tables D2 and D4*. Concentration data were ***not*** recovery corrected.

Daily Results

Concentrations of PCBs and Chlorinated benzenes and surrogate recoveries for each discrete sample are contained in *Table D5* for Windsor and in *Table D6* for Walpole Island. The same information for chlorinated phenols is contained in *Tables D7 and D8*.

TABLE D1 - MEAN CONCENTRATIONS * (ng/m^3) of PCB, CB and CP by PHASE

Compound	WINDSOR		WALPOLE ISLAND	
	Part.	Vapor	Part.	Vapor
CL_3-CB	0.01	2.63	ND	1.48
CL_4-CB	ND	0.37	ND	0.19
CL_5-CB	ND	0.13	ND	0.07
CL_6-CB	ND	0.15	ND	0.16
Total CB	***0.01***	***3.27***	ND	***1.90***
CL_1-PCB	ND	ND	ND	ND
CL_2-PCB	ND	0.05	ND	ND
CL_3-PCB	ND	0.25	ND	0.01
CL_4-PCB	ND	0.31	ND	ND
CL_5-PCB	ND	0.16	ND	ND
CL_6-PCB	ND	0.03	ND	ND
CL_7-PCB	ND	ND	ND	ND
CL_8-PCB	ND	ND	ND	ND
CL_9-PCB	ND	ND	ND	ND
CL_{10}-PCB	ND	ND	ND	ND
Total PCB	***ND***	***0.80***	ND	***0.01***
CL_2-Phenol	ND	0.65	ND	0.87
CL_3-Phenol	ND	0.13	ND	0.03
CL_4-Phenol	ND	0.24	ND	0.08
CL_5-Phenol	0.02	0.85	0.03	0.43
Total CP	***0.02***	***1.86***	***0.03***	***1.14***

ND = less than detection
* = Means calculated with ND = 0

TABLE D2 - PCB, CB and CP CONCENTRATIONS (ng/m^3) for WINDSOR FIELD BLANKS (n = 10)

Compound	No. of Samples > than detection	Mean*	Std. Dev.	Median*	Max.	Min.
CL_3-CB	8	0.11	0.10	0.07	0.27	ND
CL_4-CB	2	0.03	--	--	0.04	ND
CL_5-CB	0	--	--	--	ND	ND
CL_6-CB	0	--	--	--	ND	ND
Total CB	***8***	***0.12***	***0.10***	***0.07***	***0.27***	**ND**
CL_1-PCB	0	--	--	--	ND	ND
CL_2-PCB	0	--	--	--	ND	ND
CL_3-PCB	1	0.03	--	--	0.03	ND
CL_4-PCB	0	--	--	--	ND	ND
CL_5-PCB	0	--	--	--	ND	ND
CL_6-PCB	0	--	--	--	ND	ND
CL_7-PCB	0	--	--	--	ND	ND
CL_8-PCB	0	--	--	--	ND	ND
CL_9-PCB	0	--	--	--	ND	ND
CL_{10}-PCB	0	--	--	--	ND	ND
Total PCB	***1***	***0.03***	--	--	***0.03***	***ND***
CL_2-Phenol	1	0.03	--	--	0.03	ND
CL_3-Phenol	0	--	--	--	ND	ND
CL_4-Phenol	0	--	--	--	ND	ND
CL_5-Phenol	1	0.03	--	--	0.03	ND
Total CP	***1***	0.06	--	--	***0.06***	***ND***

* for samples > detection limit

TABLE D3 - PERCENTAGE RECOVERIES of CB, PCB and CP SURROGATES - WINDSOR

Surrogate	Count	Mean	Max.	Min.	Std.Dev.
$^{13}C_6$-CL_4-CB	31	46%	92%	1%	25
$^{13}C_6$-CL_6-CB	37	66	106	6	23
$^{13}C_{12}$-CL_5-PCB	37	85	111	53	16
$^{13}C_{12}$-CL_8-PCB	37	94	136	62	18
$^{13}C_6$-CL_2-Phenol	37	82	124	32	23
$^{13}C_6$-CL_4-Phenol	37	92	123	16	22
$^{13}C_6$-CL_5-Phenol	37	91	149	10	33

TABLE D4 - PERCENTAGE RECOVERIES of CB, PCB and CP SURROGATES - WALPOLE ISLAND

Surrogate	Count	Mean	Max.	Min.	Std.Dev.
$^{13}C_6$-CL_4-CB	26	38%	82%	1%	28
$^{13}C_6$-CL_6-CB	26	72	101	41	15
$^{13}C_{12}$-CL_5-PCB	26	89	107	47	13
$^{13}C_{12}$-CL_8-PCB	26	93	130	54	18
$^{13}C_6$-CL_2-Phenol	26	77	108	47	19
$^{13}C_6$-CL_4-Phenol	26	88	103	67	13
$^{13}C_6$-CL_5-Phenol	26	98	123	51	19

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	1-Aug-87	1-Aug-87	18-Sep-87	18-Sep-87	18-Oct-87	18-Oct-87
CL3-CB	0.21	1.28	ND	ND	ND	2.04
CL4-CB	ND	0.04	ND	0.16	ND	0.26
CL5-CB	ND	0.04	ND	0.13	ND	0.13
CL6-CB	ND	0.08	ND	0.24	ND	0.18
TOTAL CB	0.21	1.45	-	0.53	-	2.62
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	0.13	ND	0.35	ND	0.17
CL3-PCB	ND	0.55	ND	0.73	ND	0.15
CL4-PCB	ND	0.38	ND	0.82	ND	0.41
CL5-PCB	ND	0.21	ND	0.29	ND	0.13
CL6-PCB	ND	ND	ND	0.16	ND	ND
CL7-PCB	ND	ND	ND	0.06	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	1.26	-	2.40	-	0.85
RECOVERY (%)						
13C6-CL4-CB	1	58	1	19	-	-
13C6-CL6-CB	6	84	39	75	12	69
13C12-CL5-PCB	75	109	99	111	56	80
13C12-CL8-PCB	98	111	121	119	98	95
d10-Fluoranthene	95	117	95	106	95	85
SAMPLE DATE	1-Aug-87	1-Aug-87	18-Sep-87	18-Sep-87	18-Oct-87	18-Oct-87
SAMPLE TYPE	FILTER	PUFS	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	476	476	697	697	543	543
TSP (μg/m³)	58.82		82.90		61.69	
SAMPLE ID	WW-3	WW-4a	WW-24	WW-25a	WW-36	WW-37

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	30-Oct-87	30-Oct-87	17-Nov-87	17-Nov-87	29-Dec-87	29-Dec-87
CL3-CB	ND	4.68	ND	3.23	ND	3.87
CL4-CB	ND	0.18	ND	0.27	ND	0.38
CL5-CB	ND	0.07	ND	0.10	ND	0.13
CL6-CB	ND	0.10	ND	0.10	ND	0.16
TOTAL CB	-	5.04	-	3.69	-	4.53
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	ND	ND	ND
CL3-PCB	ND	0.08	ND	0.08	ND	0.16
CL4-PCB	ND	0.21	ND	0.29	ND	ND
CL5-PCB	ND	0.10	ND	0.24	ND	ND
CL6-PCB	ND	0.04	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	0.44	-	0.61	-	0.16
RECOVERY (%)						
13C6-CL4-CB	-	ND	ND	ND	54	66
13C6-CL6-CB	37	68	8	60	89	75
13C12-CL5-PCB	65	82	69	80	102	70
13C12-CL8-PCB	97	91	105	98	120	78
d10-Fluoranthene	79	94	102	92	97	98
SAMPLE DATE	30-Oct-87	30-Oct-87	17-Nov-87	17-Nov-87	29-Dec-88	29-Dec-88
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	982	982	490	490	631	631
TSP (μg/m³)	94.10		51.43		27.80	
SAMPLE ID	WW-40	WW-41	WW-52	WW-53	WW-66	WW-67

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	10-Jan-88	10-Jan-88	3-Feb-88	3-Feb-88	27-Feb-88	27-Feb-88
CL3-CB	ND	0.61	ND	3.00	ND	3.14
CL4-CB	ND	0.16	ND	0.24	ND	0.47
CL5-CB	ND	0.03	ND	0.08	ND	0.11
CL6-CB	ND	0.10	ND	0.10	ND	0.14
TOTAL CB	-	0.90	-	3.42	-	3.86
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	0.03	ND	0.05	ND	ND
CL3-PCB	ND	0.03	ND	0.37	ND	0.07
CL4-PCB	ND	ND	ND	0.18	ND	0.09
CL5-PCB	ND	ND	ND	0.03	ND	0.04
CL6-PCB	ND	ND	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	0.06	-	0.63	-	0.20
RECOVERY (%)						
13C6-CL4-CB	19	40	27	50	50	77
13C6-CL6-CB	77	61	73	67	89	106
13C12-CL5-PCB	97	71	88	95	91	111
13C12-CL8-PCB	94	69	83	111	80	104
d10-Fluoranthene	108	80	95	99	90	108
SAMPLE DATE	10-Jan-88	10-Jan-88	3-Feb-88	3-Feb-88	27-Feb-88	27-Feb-88
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	619	619	766	766	554	554
TSP (μg/m³)	91.14		58.23		82.10	
SAMPLE ID	WW-74	WW-75	WW-83	WW-84	WW-91	WW-92

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	10-Mar-88	10-Mar-88	3-Apr-88	3-Apr-88	15-Apr-88	15-Apr-88
CL3-CB	ND	2.32	ND	3.75	ND	1.67
CL4-CB	ND	0.19	ND	0.26	ND	0.16
CL5-CB	ND	0.06	ND	0.07	ND	0.06
CL6-CB	ND	0.13	ND	0.15	ND	ND
TOTAL CB	-	2.70	-	4.23	-	1.89
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	ND	ND	ND
CL3-PCB	ND	0.16	ND	0.07	ND	0.09
CL4-PCB	ND	0.13	ND	0.32	ND	0.03
CL5-PCB	ND	0.03	ND	0.07	ND	ND
CL6-PCB	ND	ND	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	0.31	-	0.46	-	0.13
RECOVERY (%)						
13C6-CL4-CB	37	59	52	69	ND	54
13C6-CL6-CB	69	73	87	76	ND	62
13C12-CL5-PCB	85	84	102	92	ND	81
13C12-CL8-PCB	67	71	99	88	ND	86
d10-Fluoranthene	93	91	111	97	ND	84
SAMPLE DATE	10-Mar-88	10-Mar-88	3-Apr-88	3-Apr-88	15-Apr-88	15-Apr-88
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	637	637	538	538	636	636
TSP (μg/m³)	64.40		58.70		79.40	
SAMPLE ID	WW-97	WW-98	WW-109	WW-110	WW-113	WW-114

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	9-May-88	9-May-88	21-May-88	21-May-88	26-Jun-88	26-Jun-88
CL3-CB	ND	7.53	ND	1.66	ND	1.55
CL4-CB	ND	0.34	ND	0.17	ND	0.26
CL5-CB	ND	0.17	ND	0.17	ND	0.10
CL6-CB	ND	0.27	ND	0.20	ND	0.13
TOTAL CB	-	8.31	-	2.19	-	2.04
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	0.03	ND	0.10
CL3-PCB	ND	0.44	ND	0.23	ND	0.26
CL4-PCB	ND	ND	ND	0.33	ND	0.19
CL5-PCB	ND	0.20	ND	0.17	ND	0.39
CL6-PCB	ND	ND	ND	ND	ND	0.07
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	0.64	-	0.76	-	1.01
RECOVERY (%)						
13C6-CL4-CB	62	92	60	56	1	58
13C6-CL6-CB	83	92	79	72	46	69
13C12-CL5-PCB	108	107	98	88	63	69
13C12-CL8-PCB	116	106	100	88	70	74
d10-Fluoranthene	110	124	104	97	103	85
SAMPLE DATE	9-May-88	9-May-88	21-May-88	21-May-88	26-Jun-88	26-Jun-88
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	595	595	603	603	691	691
TSP (µg/m³)	124.30		107.60		62.90	
SAMPLE ID	WW-125	WW-126	*WW-129	*WW-130	WW-143	WW-144

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	8-Jul-88	8-Jul-88	20-Jul-88	20-Jul-88	13-Aug-88	13-Aug-88
CL3-CB	ND	6.44	ND	2.87	ND	ND
CL4-CB	ND	2.56	ND	0.60	ND	0.23
CL5-CB	ND	0.50	ND	0.20	ND	0.18
CL6-CB	ND	0.21	ND	0.25	ND	0.20
TOTAL CB	-	9.72	-	3.91	-	0.60
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	0.07	ND	0.05	ND	ND
CL3-PCB	ND	0.24	ND	0.63	ND	0.21
CL4-PCB	ND	1.32	ND	0.15	ND	0.96
CL5-PCB	ND	0.49	ND	0.18	ND	0.39
CL6-PCB	ND	0.06	ND	0.06	ND	0.18
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	2.17	-	1.07	-	1.75
RECOVERY (%)						
13C6-CL4-CB	6	50	1	80	68	64
13C6-CL6-CB	64	67	50	75	85	70
13C12-CL5-PCB	72	65	78	77	102	85
13C12-CL8-PCB	80	78	91	92	136	116
d10-Fluoranthene	95	76	106	95	103	89
SAMPLE DATE	8-Jul-88	8-Jul-88	20-Jul-88	20-Jul-88	13-Aug-88	13-Aug-88
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	714	714	653	653	612	612
TSP (μg/m³)	162.70		48.90		113.30	
SAMPLE ID	WW-147	WW-148	WW-155	WW-156	WW-165	WW-166

Table D5 : PCB and CB Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	25-Aug-88	25-Aug-88
CL3-CB	ND	0.24
CL4-CB	ND	0.12
CL5-CB	ND	0.08
CL6-CB	ND	0.09
TOTAL CB	-	0.54
CL1-PCB	ND	ND
CL2-PCB	0.03	ND
CL3-PCB	ND	0.16
CL4-PCB	ND	0.09
CL5-PCB	ND	0.10
CL6-PCB	ND	0.02
CL7-PCB	ND	ND
CL8-PCB	ND	ND
CL9-PCB	ND	ND
CL10-PCB	ND	ND
TOTAL PCB	0.03	0.37
RECOVERY (%)		
13C6-CL4-CB	57	39
13C6-CL6-CB	77	44
13C12-CL5-PCB	87	53
13C12-CL8-PCB	78	62
d10-Fluoranthene	87	95
SAMPLE DATE	25-Aug-88	25-Aug-88
SAMPLE TYPE	FILTER	PUF/XAD
SAMPLE VOLUME (m³)	988	988
TSP (μg/m³)	77.76	
SAMPLE ID	WW-175	WW-176

Table D6: PCB and CB Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	22-Jan-88	22-Jan-88	27-Feb-88	27-Feb-88	10-Mar-88	10-Mar-88
CL3-CB	ND	1.89	ND	0.57	ND	1.58
CL4-CB	ND	0.22	ND	0.05	ND	0.18
CL5-CB	ND	0.06	ND	0.02	ND	0.04
CL6-CB	ND	0.13	ND	0.03	ND	0.14
TOTAL CB	-	2.30	-	0.67	-	1.94
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	ND	ND	ND
CL3-PCB	ND	ND	ND	ND	ND	ND
CL4-PCB	ND	ND	ND	ND	ND	ND
CL5-PCB	ND	ND	ND	ND	ND	ND
CL6-PCB	ND	ND	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	-	-	-	-	-
RECOVERY (%)						
13C6-CL4-CB	13	50	14	45	13	47
13C6-CL6-CB	59	81	59	83	59	82
13C12-CL5-PCB	95	96	94	106	95	107
13C12-CL8-PCB	106	102	98	123	105	116
d10-Fluoranthene	105	98	100	102	100	103
SAMPLE DATE	22-Jan-88	22-Jan-88	27-Feb-88	27-Feb-88	10-Mar-88	10-Mar-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	635	635	2019	2019	558	558
TSP (μg/m³)	19.4		59.3		12.8	
SAMPLE ID	WAL-1	WAL-2	WAL-13	WAL-14	WAL-15	WAL-16

Table D6: PCB and CB Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	22-Mar-88	22-Mar-88	3-Apr-88	3-Apr-88	15-Apr-88	15-Apr-08
CL3-CB	ND	1.65	ND	1.94	ND	1.35
CL4-CB	ND	0.18	ND	0.20	ND	0.15
CL5-CB	ND	0.06	ND	0.08	ND	0.03
CL6-CB	ND	0.13	ND	0.15	ND	0.12
TOTAL CB	-	2.02	-	2.37	-	1.65
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	ND	ND	ND
CL3-PCB	ND	ND	ND	0.03	ND	ND
CL4-PCB	ND	ND	ND	ND	ND	ND
CL5-PCB	ND	ND	ND	ND	ND	ND
CL6-PCB	ND	ND	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	-	-	0.03	-	-
RECOVERY (%)						
13C6-CL4-CB	15	82	23	78	31	77
13C6-CL6-CB	79	101	78	95	74	89
13C12-CL5-PCB	87	99	90	99	88	99
13C12-CL8-PCB	86	90	84	88	79	86
d10-Fluoranthene	108	112	105	110	99	96
SAMPLE DATE	22-Mar-88	22-Mar-88	3-Apr-88	3-Apr-88	15-Apr-88	15-Apr-08
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	709	709	608	608	654	654
TSP (μg/m³)	19.9		39.5		28.8	
SAMPLE ID	WAL-23	WAL-24	WAL-27	WAL-28	WAL-35	WAL-36

Table D6: PCB and CB Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	9-May-88	9-May-88	21-May-88	21-May-88	2-Jun-88	2-Jun-88
CL3-CB	ND	3.90	ND	2.51	ND	1.03
CL4-CB	ND	0.22	ND	0.31	ND	0.17
CL5-C3	ND	ND	ND	0.18	ND	0.06
CL6-CB	ND	0.24	ND	0.26	ND	0.15
TOTAL CB	-	4.36	-	3.26	-	1.41
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	ND	ND	ND
CL3-PCB	ND	ND	ND	ND	ND	ND
CL4-PCB	ND	ND	ND	ND	ND	ND
CL5-PCB	ND	ND	ND	ND	ND	ND
CL6-PCB	ND	ND	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	-	-	-	-	-
RECOVERY (%)						
13C6-CL4-CB	16	68	14	76	22	66
13C6-CL6-CB	77	87	59	88	70	68
13C12-CL5-PCB	87	89	83	95	95	87
13C12-CL8-PCB	86	88	83	88	130	112
d10-Fluoranthene	109	98	99	103	117	115
SAMPLE DATE	9-May-88	9-May-88	21-May-88	21-May-88	2-Jun-88	2-Jun-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	592	592	453	453	477	477
TSP (μg/m³)	140.5		111.6		75.3	
SAMPLE ID	WAL-43	WAL-44	WAL-47	WAL-48	*WAL-55	*WAL-56

Table D6: PCB and CB Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	26-Jun-88	26-Jun-88	8-Jul-88	8-Jul-88	20-Jul-88	20-Jul-88
CL3-CB	ND	0.38	ND	1.52	ND	0.49
CL4-CB	ND	0.10	ND	0.42	ND	0.13
CL5-CB	ND	0.07	ND	0.18	ND	0.07
CL6-CB	ND	0.16	ND	0.29	ND	0.16
TOTAL CB	-	0.71	-	2.42	-	0.84
CL1-PCB	ND	ND	ND	ND	ND	ND
CL2-PCB	ND	ND	ND	ND	ND	ND
CL3-PCB	ND	ND	ND	0.07	ND	ND
CL4-PCB	ND	ND	ND	ND	ND	ND
CL5-PCB	ND	ND	ND	ND	ND	ND
CL6-PCB	ND	ND	ND	ND	ND	ND
CL7-PCB	ND	ND	ND	ND	ND	ND
CL8-PCB	ND	ND	ND	ND	ND	ND
CL9-PCB	ND	ND	ND	ND	ND	ND
CL10-PCB	ND	ND	ND	ND	ND	ND
TOTAL PCB	-	-	-	0.07	-	-
RECOVERY (%)						
13C6-CL4-CB	3	66	1	69	9	46
13C6-CL6-CB	47	74	49	86	64	57
13C12-CL5-PCB	75	64	87	101	83	78
13C12-CL8-PCB	70	66	92	117	86	75
d10-Fluoranthene	83	95	107	120	98	90
SAMPLE DATE	26-Jun-88	26-Jun-88	8-Jul-88	8-Jul-88	20-Jul-88	20-Jul-88
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	575	575	545	545	450	450
TSP (μg/m³)	62.3		98.7		68.8	
SAMPLE ID	WAL-59	WAL-60	WAL-67	WAL-68	WAL-71	WAL-72

Table D6: PCB and CB Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	1-Aug-88	1-Aug-88
CL3-CB	ND	0.39
CL4-CB	ND	0.09
CL5-CB	ND	0.07
CL6-CB	ND	0.16
TOTAL CB	-	0.71
CL1-PCB	ND	ND
CL2-PCB	ND	ND
CL3-PCB	ND	ND
CL4-PCB	ND	ND
CL5-PCB	ND	ND
CL6-PCB	ND	ND
CL7-PCB	ND	ND
CL8-PCB	ND	ND
CL9-PCB	ND	ND
CL10-PCB	ND	ND
TOTAL PCB	-	-
RECOVERY (%)		
13C6-CL4-CB	2	32
13C6-CL6-CB	61	41
13C12-CL5-PCB	100	47
13C12-CL8-PCB	112	54
d10-Fluoranthene	111	66
SAMPLE DATE	1-Aug-88	1-Aug-88
SAMPLE TYPE	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	434	434
TSP (μg/m³)	79.3	
SAMPLE ID	WAL-79	WAL-80

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	1-Aug-87	1-Aug-87	18-Sep-87	18-Sep-87	18-Oct-87	18-Oct-87
CL2-PHENOL	ND	0.53	ND	0.94	ND	0.39
CL3-PHENOL	ND	0.21	ND	0.29	ND	ND
CL4-PHENOL	ND	0.67	ND	0.47	ND	0.03
CL5-PHENOL	ND	1.34	0.04	1.38	ND	0.27
TOTAL CP	-	2.75	0.04	3.07	-	0.69
RECOVERY (%)						
13C6-CL2-PHENOL	60	103	83	99	99	104
13C6-CL4-PHENOL	16	123	62	100	76	102
13C6-CL5-PHENOL	54	101	94	107	114	101
d10-Fluoranthene	101	113	98	97	102	97
SAMPLE TYPE	FILTER	PUFS	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³	476	476	697	697	952	952
TSP (μg/m³)	58.8		82.9		54.6	
SAMPLE ID	WW-3	WW-4a	WW-24	WW-25a	WW-36	WW-37

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	30-Oct-87	30-Oct-87	17-Nov-87	17-Nov-87	29-Dec-87	29-Dec-87
CL2-PHENOL	ND	0.33	ND	0.37	ND	0.19
CL3-PHENOL	ND	0.07	ND	0.08	ND	ND
CL4-PHENOL	ND	0.11	ND	0.10	ND	ND
CL5-PHENOL	0.07	0.35	ND	0.39	ND	ND
TOTAL CP	0.07	0.86	-	0.94	-	0.19
RECOVERY (%)						
13C6-CL2-PHENOL	32	94	100	120	124	105
13C6-CL4-PHENOL	44	101	75	117	112	107
13C6-CL5-PHENOL	99	110	107	101	117	98
d10-Fluoranthene	115	101	98	105	100	105
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³	982	982	490	490	631	631
TSP (μg/m³)	94.1		51.4		27.8	
SAMPLE ID	WW-40	WW-41	WW-52	WW-53	WW-66	WW-67

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	10-Jan-88	10-Jan-88	3-Feb-88	3-Feb-88	27-Feb-88	27-Feb-88
CL2-PHENOL	ND	ND	ND	0.21	ND	0.29
CL3-PHENOL	ND	ND	ND	0.16	ND	ND
CL4-PHENOL	ND	ND	ND	ND	ND	ND
CL5-PHENOL	ND	ND	ND	ND	ND	ND
TOTAL CP	-	-	-	0.37	-	-
RECOVERY (%)						
13C6-CL2-PHENOL	100	69	93	73	97	88
13C6-CL4-PHENOL	103	95	103	98	94	113
13C6-CL5-PHENOL	10	12	23	15	77	90
d10-Fluoranthene	112	110	101	101	98	102
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³	619	619	766	766	554	554
TSP (μg/m³)	91.1		58.2		82.1	
SAMPLE ID	*WW-74	*WW-75	*WW-83	*WW-84	WW-91	WW-92

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	10-Mar-88	10-Mar-88	3-Apr-88	3-Apr-88	15-Apr-88	15-Apr-88
CL2-PHENOL	ND	0.28	ND	0.54	ND	0.47
CL3-PHENOL	ND	ND	ND	0.07	ND	ND
CL4-PHENOL	ND	ND	ND	0.35	ND	ND
CL5-PHENOL	ND	ND	ND	0.80	ND	0.09
TOTAL CP	-	0.28	-	1.76	-	0.57
RECOVERY (%)						
13C6-CL2-PHENOL	104	70	99	63	99	47
13C6-CL4-PHENOL	106	105	103	107	96	100
13C6-CL5-PHENOL	89	65	107	110	97	99
d10-Fluoranthene	98	102	100	85	105	87
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³	637	637	538	538	636	636
TSP (μg/m³)	64.4		58.7		79.4	
SAMPLE ID	WW-97	WW-98	WW-109	WW-110	WW-113	WW-114

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	9-May-88	9-May-88	21-May-88	21-May-88	26-Jun-88	26-Jun-88
CL2-PHENOL	ND	1.92	ND	2.39	ND	0.55
CL3-PHENOL	ND	0.15	ND	0.27	ND	0.12
CL4-PHENOL	ND	0.25	ND	0.65	ND	0.10
CL5-PHENOL	ND	1.23	0.12	1.26	ND	0.75
TOTAL CP	-	3.55	0.12	4.56	-	1.52
RECOVERY (%)						
13C6-CL2-PHENOL	70	50	103	81		39
13C6-CL4-PHENOL	72	102	108	119		63
13C6-CL5-PHENOL	87	110	115	125		84
d10-Fluoranthene	91	90	89	107		105
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³	595	595	603	603	691	691
TSP (μg/m³)	124.3		107.6		62.9	
SAMPLE ID	WW-125	WW-126	*WW-129	*WW-130	WW-143	WW-144

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	8-Jul-88	8-Jul-88	20-Jul-88	20-Jul-88	13-Aug-88	13-Aug-88
CL2-PHENOL	ND	0.95	ND	0.86	ND	0.39
CL3-PHENOL	ND	0.42	ND	0.28	ND	0.20
CL4-PHENOL	ND	0.48	ND	0.29	ND	0.82
CL5-PHENOL	0.03	2.63	0.03	1.44	ND	3.19
TOTAL CP	0.03	4.48	0.03	2.87	-	4.59
RECOVERY (%)						
13C6-CL2-PHENOL	88	40	84	52	77	74
13C6-CL4-PHENOL	82	82	63	84	71	116
13C6-CL5-PHENOL	127	111	113	109	86	141
d10-Fluoranthene	111	108	105	115	72	97
SAMPLE TYPE	FILTER	PUF/XAD	FILTER	PUF/XAD	FILTER	PUF/XAD
SAMPLE VOLUME (m³	714	714	653	653	612	612
TSP (μg/m³)	162.7		48.9		113.3	
SAMPLE ID	WW-147	WW-148	WW-155	WW-156	WW-165	WW-166

Table D7 : CP Concentrations (ng/m³) by Sampling Day - Windsor

COMPOUND	25-Aug-88	25-Aug-88
CL2-PHENOL	ND	0.77
CL3-PHENOL	ND	0.15
CL4-PHENOL	ND	0.30
CL5-PHENOL	0.02	1.11
TOTAL CP	0.02	2.34
RECOVERY (%)		
13C6-CL2-PHENOL	77	74
13C6-CL4-PHENOL	80	101
13C6-CL5-PHENOL	126	149
d10-Fluoranthene	84	84
SAMPLE TYPE	FILTER	PUF/XAD
SAMPLE VOLUME (m^3	988	988
TSP ($\mu g/m^3$)	77.7	
SAMPLE ID	WW-175	WW-176

Table D8 : CP Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	22-Jan-88	22-Jan-88	27-Feb-88	27-Feb-88	10-Mar-88	10-Mar-88
CL2-PHENOL	ND	0.09	ND	0.04	ND	0.18
CL3-PHENOL	ND	ND	ND	ND	ND	ND
CL4-PHENOL	ND	ND	ND	ND	ND	ND
CL5-PHENOL	ND	ND	ND	0.04	ND	ND
TOTAL CP	-	0.09	-	0.08	-	0.18
RECOVERY (%)						
13C6-CL2-PHENOL	108	84	96	67	94	84
13C6-CL4-PHENOL	92	96	77	91	68	102
13C6-CL5-PHENOL	118	90	108	100	117	104
d10-Fluoranthene	105	89	100	94	98	98
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	635	635	2019	2019	558	558
TSP (μg/m³)	19.4		59.3		12.8	
SAMPLE ID	WAL-1	WAL-2	WAL-13	WAL-14	WAL-15	WAL-16

Table D8 : CP Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	22-Mar-88	22-Mar-88	3-Apr-88	3-Apr-88	15-Apr-88	15-Apr-88
CL2-PHENOL	ND	0.17	ND	0.20	ND	0.21
CL3-PHENOL	ND	ND	ND	ND	ND	ND
CL4-PHENOL	ND	ND	ND	0.20	ND	ND
CL5-PHENOL	0.18	ND	0.25	0.53	ND	ND
TOTAL CP	0.18	0.17	0.25	0.92	-	0.21
RECOVERY (%)						
13C6-CL2-PHENOL	101	64	94	50	101	65
13C6-CL4-PHENOL	101	101	86	96	100	103
13C6-CL5-PHENOL	102	89	97	80	100	104
d10-Fluoranthene	97	100	91	96	91	98
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	709	709	608	608	654	654
TSP (μg/m³)	19.9		39.5		28.8	
SAMPLE ID	WAL-23	WAL-24	WAL-27	WAL-28	WAL-35	WAL-36

Table D8 : CP Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	9-May-88	9-May-88	21-May-88	21-May-88	2-Jun-88	2-Jun-88
CL2-PHENOL	ND	1.35	ND	1.94	ND	1.03
CL3-PHENOL	ND	ND	ND	0.09	ND	0.06
CL4-PHENOL	ND	ND	ND	0.22	ND	0.04
CL5-PHENOL	ND	0.78	ND	0.97	ND	0.15
TOTAL CP	-	2.13	-	3.22	-	1.28
RECOVERY (%)						
13C6-CL2-PHENOL	91	57	91	49	83	50
13C6-CL4-PHENOL	76	100	76	102	75	84
13C6-CL5-PHENOL	106	97	106	107	78	51
d10-Fluoranthene	91	98	91	125	105	106
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	592	592	453	453	477	477
TSP (μg/m³)	140.5		111.6		75.3	
SAMPLE ID	WAL-43	WAL-44	WAL-47	WAL-48	*WAL-55	*WAL-56

Table D8 : CP Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	26-Jun-88	26-Jun-88	8-Jul-88	8-Jul-88	20-Jul-88	20-Jul-88
CL2-PHENOL	ND	1.41	ND	1.17	ND	2.27
CL3-PHENOL	ND	0.10	ND	0.07	ND	0.04
CL4-PHENOL	ND	0.05	ND	0.15	ND	0.11
CL5-PHENOL	ND	0.17	ND	0.95	ND	0.29
TOTAL CP	-	1.74	-	2.35	-	2.71
RECOVERY (%)						
13C6-CL2-PHENOL	79	66	90	52	91	47
13C6-CL4-PHENOL	68	96	71	88	86	73
13C6-CL5-PHENOL	107	72	102	116	123	51
d10-Fluoranthene	103	120	109	109	108	124
SAMPLE TYPE	FILTER	PUFS/XAD	FILTER	PUFS/XAD	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	575	575	545	545	450	450
TSP (μg/m³)	62.3		98.7		68.8	
SAMPLE ID	WAL-59	WAL-60	WAL-67	WAL-68	WAL-71	WAL-72

Table D8 : CP Concentrations (ng/m³) by Sampling Day - Walpole Island

COMPOUND	1-Aug-88	1-Aug-88
CL2-PHENOL	ND	1.27
CL3-PHENOL	ND	ND
CL4-PHENOL	ND	0.30
CL5-PHENOL	ND	1.66
TOTAL CP	-	3.23
RECOVERY (%)		
13C6-CL2-PHENOL	82	67
13C6-CL4-PHENOL	67	101
13C6-CL5-PHENOL	117	115
d10-Fluoranthene	103	86
SAMPLE TYPE	FILTER	PUFS/XAD
SAMPLE VOLUME (m³)	434	434
TSP (μg/m³)	79.3	
SAMPLE ID	WAL-79	WAL-80

APPENDIX E

Volatile Organics

Sampling

Sampling was carried out using Summa-polished evacuated canisters. Total sample volumes were approximately 12 L over 24 hr. A brief description of the sampling and analytical protocol is included.

Detection levels were approximately 0.01 to 0.10 ppbv. Summary statistics for all VOC species measured at Windsor are contained in *Table E1*. A summary of VOC concentrations measured at Walpole Island is contained in *Table E2*. Concentrations of each compound by sampling day are given in *Table E3* for Windsor and *Table E4* for Walpole Island.

Environment Canada

Method Description

CRYOGENIC PRECONCENTRATION GAS CHROMATOGRAPHIC ANALYSIS of VOLATILE ORGANIC COMPOUNDS in AMBIENT AIR

EXPERIMENTAL

Ambient air samples were collected in 6 liter SUMMA passivated stainless steel canisters (Scientific Instrumentation Specialists, Moscow, Idaho). A stainless steel metal bellows-type pump or a stainless steel - Viton Neuberger pump was used to pump the air sample into the canister to a pressure of approximately 15 to 25 psi. The sampling flow rate was regulated by a Millaflow flow controller (Veriflo Corp., Richmond, California.). Before collecting an ambient air sample, each canister was cleaned by alternately evacuating it to a vacuum of 5 torr and then pressurizing it to 30 psi with UHP air. This cycle was repeated three times. The last fill with zero air was analyzed to verify that the canister was clean (total NMOC less than 50 ppbc) before the final evacuation. Cleaned canisters were sent to the field for sampling.

The basic analytical apparatus for the preconcentration of VOCs is shown in Figure 1a and 1b.[1] Major components include a sample volume metering system, a Nafion Perma Pure dryer, a six port gas valve, a cryogenic preconcentration trap, and a gas chromatograph with flame ionization detector (FID) and electron capture detector (ECD) or a quadrapole mass spectrometer (HP-5970 MSD, Hewlett-Packard). The gas chromatograph used for speciation was a Hewlett-Packard model 5890. Hydrocarbons were separated on a 50 meter, 0.32 mm I.D. fused silica capillary column (Hewlett-Packard) with a 1.0 um thick film of HP-1 bonded liquid phase and programmed from -50°C, held for 3 min., to 280°C at 8°C/min and held at 280°C for 8 min. A column effluent splitter was used to allow simultaneous detection by both FID and ECD. The cryogenic trap was a 30 cm, 0.32 cm O.D. nickel tube packed with 60/80 mesh untreated glass beads. The cryogen used was liquid oxygen (-183°C).

Three gas chromatographic analyses were performed on each canister sample. The sample was first analyzed by a GC system with fused silica capillary column and parallel flame ionization and electron capture detectors. This procedure serves as an initial screening run that supplies quantitative analysis for C2 to C12 hydrocarbons and for a limited number of halogenated hydrocarbons. The second analytical run was performed on a fused silica capillary column GC system coupled to a quadrapole mass selective detector (MSD). The GC-MSD was programmed to acquire data for only target compounds and to disregard all others. This was achieved using selected ion monitoring (SIM) coupled to retention time discriminators developed by US EPA (Method TO-14).[1] This detection technique is highly specific and sensitive. The C2 hydrocarbons, which could not consistently be resolved on a fused silica capillary column, were separated on a 2 meter 3.2 mm O.D. nickel column packed with 80/100 mesh HayeSept T. A Perkin-Elmer Sigma 3B gas chromatograph was used. The packed column was temperature programmed from 50°C, held for 5 min., to 100°C at 10°C/min.

For all analyses, approximately one liter of sample air was pre-concentrated using liquid oxygen prior to injection and GC separation. Electronic mass flow controllers (Model FC-280, Tylan Corp., Carson, California) were used to maintain constant sample gas flow at 40 cc/min. A total sample volume of ~ one liter was collected into the cryogenic trap of the analytical system by sampling for 28 minutes. All flow rates were

verified with a soap-film bubble flowmeter. Perma Pure Dryers were used for the two fused silica capillary GC systems to remove water vapor from the gas stream prior to analyte preconcentration. The dryer was used to prevent blockage of the trap and/or capillary column by ice formation at reduced temperature. To prevent excessive moisture build-up and any memory effects in the dryer, an automated clean-up procedure involving periodic heating of the dryer at 100°C for 20 minutes while purging with UHP air was employed. The clean-up procedure was repeated during each analysis.

The cryogenic trap condenses NMOC while permitting air and methane to pass through. Following the trapping mode, the six-port valve was switched to the inject position, directing the helium carrier gas through the trap, in the direction opposite to the previous sample flow for a few seconds. The cryogen was then removed, and the trap was heated to approximately 100°C. Organic compounds collected in the trap revolatilized and were injected onto the capillary column. The organic compounds were separated by the fused silica capillary column and identification and quantitative analysis were made using FID-ECD or MSD.

Calibration of the GC systems were obtained using multi-component mixture gases prepared in a 3 liter flask from individual hydrocarbon standards in our laboratory and from Scott Specialty Gases, Inc. The gases were diluted with UHP air to nominal concentrations of 10 ng/liter. Calibration curves were constructed for each component of the standard mixture. A Nelson Analytical 3000 series chromatography data system (IBM-AT base) was used to acquire and process data from GC-FID-ECD system. Peak identification for the GC-FID-ECD system was based on gas chromatographic retention time and GC-MSD confirmation.

1. William T. Winberry, Jr., Norm V. Tilley and R.M. Riggin, "Compendium of Methods for the Determination of Toxic Organic Compoounds in Ambient Air", Method TO-14, EPA-600/4-84-041, May, 1987.

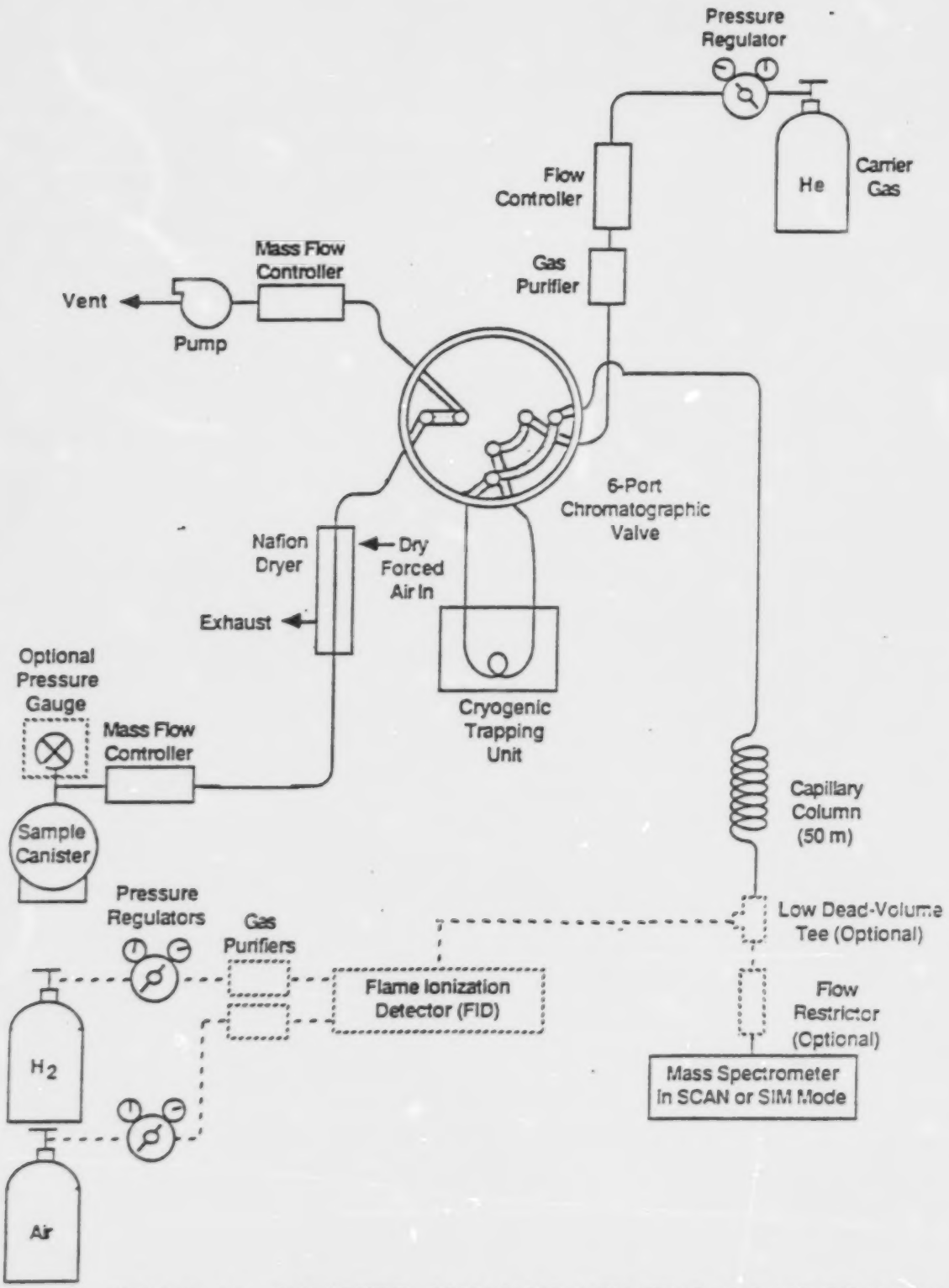


FIGURE 1A CANISTER ANALYSIS UTILIZING GC-MS-SCAN-SIM ANALYTICAL SYSTEM WITH OPTIONAL FLAME IONIZATION DETECTOR

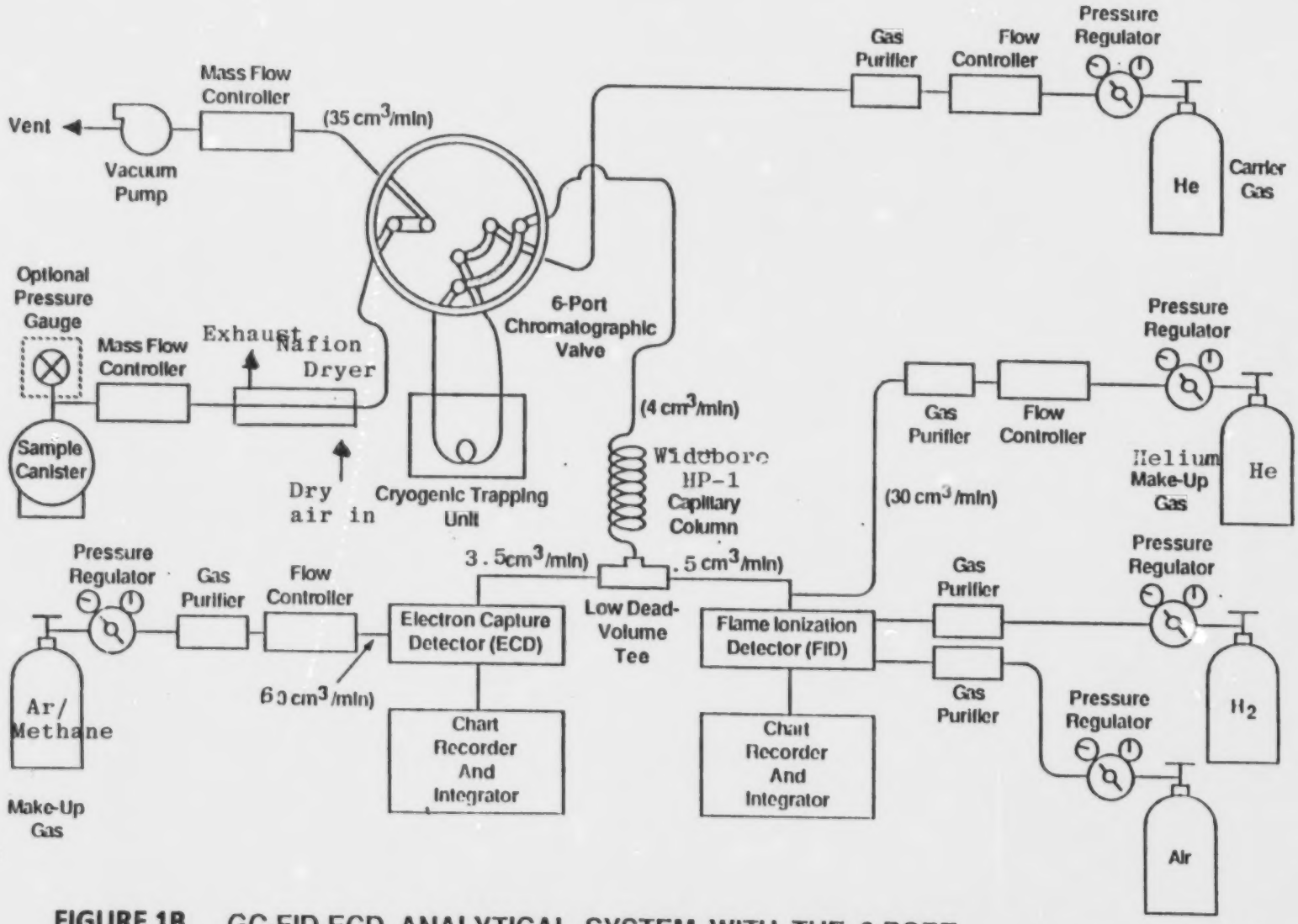


FIGURE 1B GC-FID-ECD ANALYTICAL SYSTEM WITH THE 6-PORT CHROMATOGRAPHIC VALVE IN THE SAMPLE DESORPTION MODE.

Table E1: Concentrations of VOC (ppbv) measured at Windsor

Compounds	No. of Samples	Mean	Std. Dev.	Median	Maximum	Minimum
C2	19	16.19	8.66	13.24	33.38	3.97
Propylene	58	0.79	0.41	0.72	2.08	0.13
Propane	58	2.31	1.21	1.89	5.05	0.61
1-Propyne	39	0.09	0.06	0.07	0.29	ND
Isobutane	58	1.42	1.08	1.16	5.29	0.10
1-Butene/Isobutene	58	1.79	0.86	1.60	4.59	0.35
1,3-Butadiene	58	0.22	0.25	0.16	1.74	ND
Butane	58	6.05	3.76	4.80	17.55	1.56
trans-2-Butene	58	0.38	0.37	0.25	1.60	0.02
2,2-Dimethylpropane	39	0.01	0.01	ND	0.06	ND
1-Butyne	39	-	-	ND	0.01	ND
cis-2-Butene	58	0.21	0.26	0.14	1.88	ND
2-Methyl-1-butene	58	0.10	0.10	0.06	0.40	0.02
Isopentane	58	3.96	2.15	3.35	10.31	1.17
1-Pentene	58	0.12	0.07	0.11	0.35	ND
2-Methyl-1-pentene	39	0.10	0.07	0.08	0.40	ND
Pentane	58	2.17	1.03	1.91	5.20	0.80
Isoprene	58	0.39	0.55	0.18	3.01	ND
trans-2-Pentene	58	0.21	0.12	0.17	0.65	0.07
cis-2-Pentene	58	0.09	0.06	0.08	0.32	ND
2-Methyl-2-butene	58	0.37	0.22	0.33	1.05	ND
2,2-Dimethylbutane	58	0.25	0.12	0.22	0.68	0.07
3-Methyl-1-pentene	58	0.36	0.62	0.10	3.03	ND
Cyclopentane	58	0.20	0.13	0.16	0.68	ND
2,3-Dimethylbutane	58	0.27	0.16	0.23	0.81	0.06
2-Methylpentane	58	1.55	0.75	1.25	3.92	0.58
3-Methylpentane	58	0.73	0.40	0.58	1.98	0.28
1-Hexene	58	0.13	0.09	0.11	0.62	ND
Hexane	58	0.99	0.59	0.79	3.11	0.37
trans-2-Hexene	39	0.05	0.03	0.05	0.18	0.01
2-Methyl-2-pentene	39	0.06	0.04	0.05	0.21	ND
trans-3-Methyl-2-pentene	39	0.03	0.03	0.02	0.15	ND
cis-2-Hexene	39	0.01	0.01	0.02	0.04	ND
cis-3-Methyl-2-pentene	39	0.04	0.04	0.04	0.20	ND
Methylcyclopentane	58	0.40	0.23	0.31	1.08	0.13
2,4-Dimethylpentane	58	0.16	0.10	0.14	0.50	ND
Benzene	58	1.33	0.62	1.22	2.76	0.50
Cyclohexane	58	0.16	0.15	0.12	1.04	0.02
2-Methylhexane	58	0.58	0.52	0.39	2.89	0.16
2,3-Dimethylpentane	58	0.30	0.21	0.23	1.04	0.10
3-Methylhexane	58	1.53	1.35	1.02	7.27	0.46
trans-1,3-Dimethylcyclohexane	39	0.11	0.15	0.06	0.86	0.01
cis-1,3-Dimethylcyclohexane	39	0.24	0.32	0.13	1.84	0.01
2,2,4-Trimethylpentane	58	0.77	0.67	0.53	4.54	0.00
Heptane	52	1.90	3.45	0.76	21.21	0.12
t-2-Heptene	39	0.10	0.19	0.06	1.24	ND
c-2-Heptene	39	0.08	0.05	0.07	0.31	ND
Methylcyclohexane	52	1.13	2.54	0.31	16.33	0.04
2,5-Dimethylhexane	56	0.27	0.55	0.11	3.12	0.02
2,4-Dimethylhexane	39	0.42	0.69	0.18	3.81	ND
2,3,4-Trimethylpentane	58	0.20	0.13	0.16	0.76	ND
Toluene	57	4.29	2.67	3.63	14.83	1.05
2-Methylheptane	58	0.22	0.14	0.16	0.68	0.06

Table E1: Concentrations of VOC (ppbv) measured at Windsor

Compounds	No. of Samples	Mean	Std. Dev.	Median	Maximum	Minimum
4-Methylheptane	39	0.11	0.10	0.08	0.37	ND
3-Methylheptane	58	0.27	0.24	0.18	1.23	ND
2,2,5-Trimethylhexane	39	0.38	0.17	0.33	0.75	ND
Octane	58	0.23	0.17	0.19	0.86	ND
Ethylbenzene	58	0.53	0.33	0.39	1.38	0.13
2,3-Dimethylheptane	39	0.09	0.05	0.08	0.30	ND
m,p-Xylene	58	1.91	1.39	1.39	6.71	0.29
4-Methyloctane	39	0.10	0.07	0.08	0.31	ND
3-Methyloctane	39	0.06	0.06	0.03	0.23	ND
Styrene	57	0.52	0.51	0.35	2.96	0.02
o-Xylene	56	0.65	0.41	0.51	1.93	0.07
Nonane	57	0.31	0.51	0.23	3.78	ND
iso-Propylbenzene	39	0.20	0.21	0.16	1.25	0.01
n-Propylbenzene	58	0.38	0.45	0.16	2.39	ND
4-Ethyltoluene	58	0.85	0.70	0.67	3.32	0.03
3-Ethyltoluene	39	0.27	0.20	0.22	1.15	0.02
1,3,5-Trimethylbenzene	58	0.50	1.25	0.23	8.19	0.02
2-Ethyltoluene	58	0.39	0.37	0.32	2.57	ND
1,2,4-Trimethylbenzene	58	1.15	0.67	0.91	2.96	0.03
Decane	58	0.30	0.24	0.24	0.97	ND
1,2,3-Trimethylbenzene	58	0.31	0.29	0.21	1.26	ND
p-Cymene	58	0.63	0.58	0.41	2.62	ND
Indane	39	0.54	0.64	0.33	2.74	0.02
1,3-Diethylbenzene/n-Butylbenzene	58	0.84	1.18	0.52	7.91	ND
1,4-Diethylbenzene	39	0.24	0.25	0.19	1.15	ND
1,2-Diethylbenzene	39	0.56	0.48	0.45	2.03	0.02
Undecane	39	0.37	0.41	0.25	1.82	ND
Dodecane	58	0.42	0.41	0.27	1.68	0.01
Trichlorofluoromethane	39	0.27	0.07	0.25	0.47	0.17
Dichloromethane	39	1.53	0.96	0.89	5.66	0.56
Chloroform	39	0.11	0.21	0.05	1.06	0.02
1,1,1-Trichloroethane	39	0.51	0.34	0.43	1.92	0.29
Carbontetrachloride	39	0.22	0.11	0.19	0.55	0.10
Trichloroethylene	58	0.49	0.53	0.20	2.36	0.02
Tetrachloroethylene	58	0.47	0.81	0.25	5.51	0.06
1,4-Dichlorobenzene	39	1.79	0.83	0.80	3.91	0.20

Table E2: Concentrations of VOC (ppbv) measured at Walpole Island

Compounds	No. of Samples	Mean	Std. Dev.	Median	Maximum	Minimum
C2	0					
Propylene	33	0.52	0.79	0.30	3.53	0.16
Propane	33	1.39	1.37	0.99	8.23	0.50
1-Propyne	33	0.05	0.07	0.03	0.33	ND
Isobutane	33	0.37	0.23	0.38	0.76	ND
1-Butene/Isobutene	33	1.38	2.22	0.85	11.47	ND
1,3-Butadiene	33	0.06	0.10	0.03	0.47	ND
Butane	33	1.61	0.82	1.40	4.44	0.51
trans-2-Butene	33	0.07	0.17	0.03	0.79	ND
2,2-Dimethylpropane	33	-	-	ND	0.03	ND
1-Butyne	33	-	-	ND	0.11	ND
cis-Butene	33	0.05	0.10	0.03	0.53	ND
2-Methyl-1-butene	33	-	-	0.01	0.07	ND
2-Methylbutae	33	0.88	0.48	0.75	1.82	0.21
1-Pentene	33	0.17	0.40	0.08	2.33	0.02
2-Methyl-1-butene	33	-	-	ND	0.03	ND
Pentane	33	0.84	0.55	0.59	2.40	0.27
Isoprene	33	0.54	0.52	0.35	1.74	0.01
trans-2-Pentene	33	0.06	0.13	0.04	0.74	ND
cis-2-Pentene	33	-	-	ND	0.22	ND
2-Methyl-2-butene	33	0.05	0.05	0.04	0.22	ND
2,2-Dimethylbutane	33	0.06	0.04	0.05	0.20	ND
3-Methyl-1-pentene	33	0.08	0.07	0.07	0.31	ND
Cyclopentane	33	0.04	0.03	0.04	0.09	ND
2,3-Dimethylbutane	33	0.06	0.06	0.05	0.27	ND
2-Methylpentane	33	0.75	0.63	0.59	3.29	0.13
3-Methylpentane	33	0.32	0.49	0.15	2.79	0.06
1-Hexene	33	0.10	0.06	0.09	0.28	0.03
Hexane	33	3.16	8.05	0.56	44.01	0.08
trans-2-Hexene	33	0.03	0.07	ND	0.40	ND
2-Methyl-2-pentene	33	0.02	0.02	0.01	0.05	ND
trans-3-Methyl-2-pentene	33	0.04	0.08	ND	0.30	ND
cis-2-Hexene	33	-	-	ND	0.12	ND
cis-3-Methyl-2-pentene	33	0.03	0.11	ND	0.64	ND
Methylcyclopentane	33	0.77	2.30	0.10	12.94	ND
2,4-Dimethylpentane	33	0.02	0.03	0.01	0.11	ND
Benzene	33	0.41	0.22	0.37	1.25	0.18
Cyclohexane	33	0.09	0.05	0.09	0.19	0.02
2-Methylhexane	33	0.24	0.24	0.14	1.08	0.04
2,3-Dimethylpentane	33	0.09	0.09	0.05	0.35	ND
3-Methylhexane	33	1.38	1.29	0.96	5.74	0.16
trans-1,3-Dimethylcyclohexane	33	0.06	0.10	0.02	0.43	ND
cis-1,3-Dimethylcyclohexane	33	0.21	0.32	0.09	1.46	ND
2,2,4-Trimethylpentane	33	0.34	0.51	0.18	2.93	0.03
Heptane	33	1.82	3.61	0.57	15.95	0.01
t-2-Heptene	33	0.11	0.19	0.06	0.91	ND
c-2-Heptene	33	0.09	0.08	0.07	0.36	ND
Methylcyclohexane	33	0.88	1.86	0.16	7.99	ND
2,5-Dimethylhexane	33	0.06	0.10	0.03	0.48	ND
2,4-Dimethylhexane	33	0.25	0.50	0.06	2.06	ND
2,3,4-Trimethylpentane	33	0.04	0.05	0.02	0.27	ND
Toluene	33	1.32	1.11	0.87	4.77	0.22
2-Methylheptane	33	0.09	0.11	0.05	0.42	ND

Table E2: Concentrations of VOC (ppbv) measured at Walpole Island

Compounds	No. of Samples	Mean	Std. Dev.	Median	Maximum	Minimum
4-Methylheptane	33	0.06	0.10	0.03	0.36	ND
3-Methylheptane	33	0.10	0.12	0.05	0.45	ND
2,2,5-Trimethylhexane	33	0.98	1.57	0.38	8.18	0.14
Octane	33	0.11	0.15	0.06	0.84	0.02
Ethylbenzene	33	0.15	0.12	0.13	0.51	ND
2,3-Dimethylheptane	33	0.07	0.10	0.05	0.52	ND
m,p-Xylene	33	0.70	0.52	0.55	2.25	0.15
4-Methyloctane	33	0.08	0.23	0.02	1.28	ND
3-Methyloctane	33	0.06	0.14	0.01	0.75	ND
Styrene	33	0.02	0.04	ND	0.16	ND
o-Xylene	32	0.30	0.33	0.18	1.47	0.06
Nonane	32	0.15	0.17	0.07	0.68	0.02
iso-Propylbenzene	33	0.06	0.09	0.03	0.37	ND
n-Propylbenzene	33	0.16	0.30	0.06	1.59	ND
4-Ethyltoluene	33	0.19	0.15	0.12	0.63	0.06
3-Ethyltoluene	33	0.46	0.55	0.15	2.09	ND
1,3,5-Trimethylbenzene	33	0.07	0.06	0.05	0.26	ND
2-Ethyltoluene	33	0.17	0.23	0.08	1.00	ND
1,2,4-Trimethylbenzene	33	0.91	0.45	0.81	2.12	0.15
Decane	33	0.11	0.08	0.09	0.30	ND
1,2,3-Trimethylbenzene	33	0.90	1.24	0.14	3.87	ND
p-Cymene	33	0.53	2.00	0.11	11.55	ND
Indane	33	0.11	0.15	0.05	0.72	ND
1,3-Diethylbenzene/n-Butylbenzene	33	0.24	0.27	0.13	1.33	0.03
1,4-Diethylbenzene	33	0.15	0.16	0.10	0.60	ND
1,2-Diethylbenzene	33	0.38	0.52	0.17	2.46	0.02
Undecane	33	0.28	0.36	0.09	1.66	ND
Dodecane	33	0.95	1.00	0.42	3.82	0.06
Trichlorofluoromethane	33	0.56	0.23	0.48	1.40	0.30
Dichloromethane	33	0.60	0.75	0.42	4.26	ND
Chloroform	33	0.16	0.23	0.09	0.94	0.03
1,1,1-Trichloroethane	33	0.32	0.16	0.29	0.77	0.13
Carbontetrachloride	33	0.53	0.93	0.32	5.58	0.10
Trichloroethylene	33	0.18	0.18	0.11	0.93	0.03
Tetrachloroethylene	33	0.13	0.25	0.07	1.46	0.03
1,4-Dichlorobenzene	33	0.54	0.62	0.38	2.88	ND

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	20-Jul-87	26-Jul-87	1-Aug-87	7-Aug-87	13-Aug-87	19-Aug-87
C2	17.01	6.35	8.08	10.09	33.38	30.06
Propylene	1.34	1.14	0.70	0.80	0.25	1.23
Propane	4.57	3.14	1.30	2.60	0.76	4.76
1-Propyne						
Isobutane	5.29	3.32	1.60	4.52	2.31	2.30
1-Butene/Isobutene	4.59	3.85	2.72	2.58	2.30	2.04
1,3-Butadiene	0.24	ND	0.25	0.56	0.25	ND
Butane	9.40	8.34	3.83	7.72	6.48	6.25
trans-2-Butene	0.88	1.60	1.06	1.19	0.97	1.50
2,2-Dimethylpropane						
1-Butyne						
cis-2-Butene	0.49	1.88	0.44	0.54	0.28	0.50
2-Methyl-1-butene	0.27	0.15	0.17	0.33	0.28	0.19
Isopentane	7.00	4.77	3.83	6.33	5.02	5.24
1-Pentene	0.16	ND	0.12	0.16	0.11	0.15
2-Methyl-1-pentene						
Pentane	3.38	2.33	1.92	3.16	2.47	2.62
Isoprene	0.26	0.19	0.15	0.28	0.35	0.37
trans-2-Pentene	0.44	0.23	0.28	0.34	0.25	0.28
cis-2-Pentene	0.13	ND	0.09	0.14	0.09	0.09
2-Methyl-2-butene	0.61	0.55	0.44	0.63	0.50	0.57
2,2-Dimethylbutane	0.68	0.39	0.35	0.46	0.38	0.39
3-Methyl-1-pentene	0.99	0.80	0.66	0.77	0.42	0.44
Cyclopentane	0.68	0.16	0.15	0.29	0.21	0.21
2,3-Dimethylbutane	0.44	0.23	0.16	0.38	0.27	0.28
2-Methylpentane	3.92	1.84	1.25	2.20	2.56	2.55
3-Methylpentane	1.27	0.64	0.57	1.04	0.72	0.73
1-Hexene	0.62	ND	0.20	0.18	0.13	0.13
Hexane	1.13	0.79	0.59	1.36	0.78	0.81
trans-2-Hexene						
2-Methyl-2-pentene						
trans-3-Methyl-2-pentene						
cis-2-Hexene						
cis-3-Methyl-2-pentene						
Methylcyclopentane	0.44	0.39	0.25	0.57	0.33	0.34
2,4-Dimethylpentane	0.20	0.29	0.17	0.21	0.15	0.16
Benzene	2.76	2.16	1.23	2.00	1.79	1.97
Cyclohexane	0.23	0.20	0.24	0.19	0.18	0.23
2-Methylhexane	2.00	1.30	0.45	0.94	0.52	0.65
2,3-Dimethylpentane	0.70	0.24	0.16	0.40	0.19	0.29
3-Methylhexane	5.49	1.99	2.67	2.26	1.98	2.47
trans-1,3-Dimethylcyclohexane						
cis-1,3-Dimethylcyclohexane						
2,2,4-Trimethylpentane	1.53	4.54	0.32	0.95	0.36	0.53
Heptane		1.19	0.38		0.16	0.90
t-2-Heptene						
c-2-Heptene						
Methylcyclohexane		2.14	0.24		0.38	0.31
2,5-Dimethylhexane	3.12	0.86	2.59	1.20	0.09	0.13
2,4-Dimethylhexane						
2,3,4-Trimethylpentane	0.26	0.15	0.21	0.43	0.15	0.16
Toluene		5.24	2.82	8.47	3.85	3.82
2-Methylheptane	0.32	0.29	0.24	0.30	0.38	0.34
4-Methylheptane						

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	20-Jul-87	26-Jul-87	1-Aug-87	7-Aug-87	13-Aug-87	19-Aug-87
3-Methylheptane	0.76	0.43	0.31	0.58	0.62	ND
2,2,5-Trimethylhexane						
Octane	0.63	0.31	0.21	0.35	0.42	0.73
Ethylbenzene	1.32	1.38	0.62	0.95	0.62	0.61
2,3-dimethylheptane						
m,p-Xylene	5.89	5.49	1.94	3.44	2.37	2.24
4-Methyloctane						
3-Methyloctane						
Styrene	2.96	1.84	1.92	0.66	1.30	1.55
o-Xylene	1.42	1.17	0.69	1.17	0.60	0.95
Nonane	0.65	3.78	ND	ND	ND	ND
iso-Propylbenzene						
n-Propylbenzene	1.01	0.86	0.66	1.13	0.64	1.02
4-Ethyltoluene	3.32	1.37	0.71	0.82	2.70	2.79
3-Ethyltoluene						
1,3,5-Trimethylbenzene	0.53	0.54	0.25	0.34	0.50	0.61
2-Ethyltoluene	2.57	ND	0.46	0.36	0.76	0.81
1,2,4-Trimethylbenzene	2.06	2.87	1.92	0.90	2.28	2.96
Decane	0.87	0.63	0.46	0.55	0.71	0.84
1,2,3-Trimethylbenzene	1.23	0.72	0.26	0.51	0.70	0.77
p-Cymene	2.23	1.13	0.96	1.15	1.61	1.18
Indane						
1,3-Diethylbenzene/n-Butylbenzen	0.78	0.75	0.50	0.52	0.61	0.64
1,4-Diethylbenzene						
1,2-Diethylbenzene						
Undecane						
Dodecane	1.14	1.40	1.01	1.24	1.10	1.26
Trichlorofluoromethane						
Dichloromethane						
Chloroform						
1,1,1-Trichloroethane						
Carbontetrachloride						
Trichloroethylene	1.27	1.46	1.10	1.05	2.03	2.36
Tetrachloroethylene	0.55	5.51	0.72	0.52	0.78	3.32
1,4-Dichlorobenzene						

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	25-Aug-87	31-Aug-87	6-Sep-87	30-Sep-87	6-Oct-87	12-Oct-87
C2	25.00	15.77	10.63	12.98	13.08	3.97
Propylene	1.19	1.61	0.13	0.93	0.65	1.55
Propane	4.85	2.72	1.35	1.77	2.60	3.50
1-Propyne						
Isobutane	3.53	1.46	1.31	1.23	1.40	2.11
1-Butene/Isobutene	3.58	3.65	2.37	1.64	1.75	3.03
1,3-Butadiene	0.39	0.19	0.19	0.23	0.23	0.57
Butane	10.46	5.37	4.28	4.36	5.74	7.33
trans-2-Butene	1.02	0.66	0.25	1.03	0.61	0.74
2,2-Dimethylpropane						
1-Butyne						
cis-2-Butene	0.49	0.26	0.11	0.43	0.24	0.35
2-Methyl-1-butene	0.40	0.17	0.11	0.17	0.19	0.34
Isopentane	7.51	2.68	8.06	2.92	2.92	5.26
1-Pentene	0.29	0.11	ND	0.12	0.09	0.16
2-Methyl-1-pentene						
Pentane	3.75	1.83	1.52	1.60	1.64	2.80
Isoprene	0.23	0.11	0.11	0.11	0.20	0.22
trans-2-Pentene	0.49	0.21	0.13	0.21	0.21	0.37
cis-2-Pentene	0.24	0.09	ND	0.09	0.12	0.20
2-Methyl-2-butene	0.84	0.42	0.35	0.30	0.50	0.65
2,2-Dimethylbutane	0.45	0.25	0.21	0.21	0.31	0.36
3-Methyl-1-pentene	1.28	1.76	0.47	1.05	0.43	1.18
Cyclopentane	0.32	0.13	0.11	0.13	0.33	0.37
2,3-Dimethylbutane	0.56	0.21	0.14	0.25	0.32	0.49
2-Methylpentane	3.12	2.52	1.92	2.86	1.86	2.03
3-Methylpentane	1.36	0.61	0.40	0.56	0.64	0.98
1-Hexene	0.29	0.29	0.09	0.15	0.21	0.24
Hexane	1.93	0.70	0.50	0.67	0.79	1.25
trans-2-Hexene						
2-Methyl-2-pentene						
trans-3-Methyl-2-pentene						
cis-2-Hexene						
cis-3-Methyl-2-pentene						
Methylcyclopentane	0.83	0.32	0.25	0.37	0.46	0.69
2,4-Dimethylpentane	0.32	0.14	ND	0.15	0.30	0.46
Benzene	2.49	1.72	1.26	1.50	1.75	2.07
Cyclohexane	0.47	0.22	0.09	0.11	0.33	0.15
2-Methylhexane	1.41	2.89	0.29	0.85	0.73	0.60
2,3-Dimethylpentane	0.66	1.04	0.14	0.40	0.34	0.37
3-Methylhexane	3.29	7.27	0.98	2.11	1.05	1.22
trans-1,3-Dimethylcyclohexane						
cis-1,3-Dimethylcyclohexane						
2,2,4-Trimethylpentane	1.59	2.36	0.70	1.00	0.75	1.08
Heptane			0.83		1.46	0.72
t-2-Heptene						
c-2-Heptene						
Methylcyclohexane			0.18		0.28	0.35
2,5-Dimethylhexane			0.11	0.87	0.15	0.16
2,4-Dimethylhexane						
2,3,4-Trimethylpentane	0.34	0.24	0.10	0.14	0.22	0.37
Toluene	10.38	14.83	2.80	4.85	4.39	4.96
2-Methylheptane	0.42	0.44	0.11	0.23	0.56	0.44
4-Methylheptane						

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	25-Aug-87	31-Aug-87	6-Sep-87	30-Sep-87	6-Oct-87	12-Oct-87
3-Methylheptane	0.66	1.23	0.10	0.31	0.43	0.45
2,2,5-Trimethylhexane						
Octane	0.68	0.86	0.25	0.23	0.27	0.33
Ethylbenzene	1.08	1.12	0.36	0.54	0.43	0.69
2,3-dimethylheptane						
m,p-Xylene	4.81	6.71	1.38	2.21	1.56	2.37
4-Methyloctane						
3-Methyloctane						
Styrene	1.32	0.69	0.66	0.52	0.31	0.59
o-Xylene	1.48	0.89	0.53	0.71	1.40	0.79
Nonane	ND	ND	ND	0.73	ND	0.39
iso-Propylbenzene						
n-Propylbenzene	0.48	2.39	0.60	1.28	0.78	1.30
4-Ethyltoluene	1.92	1.64	1.05	1.64	1.28	0.95
3-Ethyltoluene						
1,3,5-Trimethylbenzene	0.49	0.34	0.29	0.34	0.26	0.3[illegible]
2-Ethyltoluene	0.39	0.50	0.39	1.02	0.69	0.55
1,2,4-Trimethylbenzene	2.08	2.13	1.90	2.03	1.80	1.74
Decane	0.97	0.53	0.50	0.82	0.33	0.41
1,2,3-Trimethylbenzene	0.98	0.89	0.44	0.41	0.47	0.32
p-Cymene	1.96	2.62	0.33	1.53	0.43	1.40
Indane						
1,3-Diethylbenzene/n-Butylbenzen	0.78	0.45	ND	0.53	0.38	0.37
1,4-Diethylbenzene						
1,2-Diethylbenzene						
Undecane						
Dodecane	1.68	0.80	0.86	0.93	0.65	0.53
Trichlorofluoromethane						
Dichloromethane						
Chloroform						
1,1,1-Trichloroethane						
Carbontetrachloride						
Trichloroethylene	1.20	1.02	0.99	1.08	1.13	1.05
Tetrachloroethylene	0.67	0.46	0.57	0.65	0.80	0.79
1,4-Dichlorobenzene						

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	18-Oct-87	24-Oct-87	30-Oct-87	17-Nov-87	23-Nov-87	29-Nov-87
C2	13.24	28.77	22.87	10.99	7.75	13.37
Propylene	0.80	1.84	1.02	0.43	0.46	2.08
Propane	3.07	4.43	4.37	1.84	4.61	3.07
1-Propyne						
Isobutane	1.96	4.38	3.42	1.26	1.44	1.50
1-Butene/Isobutene	2.03	2.70	2.27	2.22	2.95	1.38
1,3-Butadiene	0.18	0.52	0.73	0.28	1.74	0.14
Butane	3.95	11.18	8.19	3.68	4.80	4.75
trans-2-Butene	0.40	0.71	0.46	0.25	0.29	0.60
2,2-Dimethylpropane						
1-Butyne						
cis-2-Butene	0.20	0.39	0.24	0.14	0.13	0.06
2-Methyl-1-butene	0.17	0.40	0.27	0.10	0.10	0.11
Isopentane	2.43	6.64	5.32	1.98	2.06	5.76
1-Pentene	0.07	0.19	0.13	0.06	0.06	0.05
2-Methyl-1-pentene						
Pentane	1.42	3.39	2.69	1.36	1.35	1.24
Isoprene	0.11	0.19	0.12	0.06	0.06	0.17
trans-2-Pentene	0.14	0.47	0.32	0.13	0.13	0.13
cis-2-Pentene	0.09	0.23	0.14	0.06	0.05	0.09
2-Methyl-2-butene	0.44	0.80	0.47	0.35	0.30	0.55
2,2-Dimethylbutane	0.30	0.38	0.29	0.26	0.17	0.25
3-Methyl-1-pentene	3.03	0.55	0.39	0.28	0.29	0.36
Cyclopentane	0.28	0.37	0.27	0.11	0.12	0.25
2,3-Dimethylbutane	0.23	0.53	0.42	0.14	0.15	0.24
2-Methylpentane	1.60	2.31	2.01	1.15	1.08	1.19
3-Methylpentane	0.47	1.21	1.03	0.39	0.40	0.44
1-Hexene	0.19	0.17	0.13	0.06	0.07	0.15
Hexane	0.54	1.40	1.42	0.61	0.59	0.67
trans-2-Hexene						
2-Methyl-2-pentene						
trans-3-Methyl-2-pentene						
cis-2-Hexene						
cis-3-Methyl-2-pentene						
Methylcyclopentane	0.29	0.74	0.67	0.26	0.29	0.30
2,4-Dimethylpentane	0.14	0.28	0.20	0.07	0.08	0.15
Benzene	1.82	2.14	1.67	1.52	0.97	1.22
Cyclohexane	0.22	0.15	0.14	0.06	0.09	0.11
2-Methylhexane	0.48	0.60	0.51	0.23	0.28	0.31
2,3-Dimethylpentane	0.23	0.45	0.31	0.10	0.15	0.18
3-Methylhexane	0.96	1.06	0.92	0.68	0.73	0.82
trans-1,3-Dimethylcyclohexane						
cis-1,3-Dimethylcyclohexane						
2,2,4-Trimethylpentane	0.49	1.09	0.91	0.45	0.47	0.50
Heptane	1.53	0.61	0.56	0.43	0.56	0.21
t-2-Heptene						
c-2-Heptene						
Methylcyclohexane	0.37	0.26	0.28	0.14	0.22	0.16
2,5-Dimethylhexane	0.43	0.25	0.21	0.08	0.12	0.11
2,4-Dimethylhexane						
2,3,4-Trimethylpentane	0.37	0.34	0.23	0.07	0.08	0.11
Toluene	3.04	5.31	5.23	3.07	3.89	1.75
2-Methylheptane	0.31	0.25	0.21	0.13	0.14	0.16
4-Methylheptane						

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	18-Oct-87	24-Oct-87	30-Oct-87	17-Nov-87	23-Nov-87	29-Nov-87
3-Methylheptane	0.34	0.30	0.18	0.05	0.08	ND
2,2,5-Trimethylhexane						
Octane	0.25	0.26	0.32	0.19	0.14	0.12
Ethylbenzene	0.39	0.75	0.69	0.39	0.38	0.27
2,3-dimethylheptane						
m,p-Xylene	1.55	2.55	2.32	1.39	1.30	1.01
4-Methyloctane						
3-Methyloctane						
Styrene	0.33	0.29	0.31	0.34	0.29	0.44
o-Xylene	0.45	0.94	0.79	0.51	0.48	0.37
Nonane	0.48	0.18	0.25	0.14	0.45	0.22
iso-Propylbenzene						
n-Propylbenzene	0.92	0.25	0.23	0.65	0.16	0.12
4-Ethyltoluene	0.86	0.39	1.08	0.74	0.63	0.51
3-Ethyltoluene						
1,3,5-Trimethylbenzene	0.31	0.42	0.33	0.20	0.20	0.14
2-Ethyltoluene	0.74	0.24	0.20	0.08	0.26	0.10
1,2,4-Trimethylbenzene	1.50	1.98	1.73	1.64	1.79	1.49
Decane	0.42	0.54	0.48	0.36	0.22	0.17
1,2,3-Trimethylbenzene	0.37	0.47	0.40	0.55	0.27	0.19
p-Cymene	0.91	0.45	0.34	0.27	0.35	0.24
Indane						
1,3-Diethylbenzene/n-Butylbenzen	0.44	0.17	0.14	0.45	0.37	0.29
1,4-Diethylbenzene						
1,2-Diethylbenzene						
Undecane						
Dodecane	0.95	0.56	0.11	0.69	0.54	0.53
Trichlorofluoromethane						
Dichloromethane						
Chloroform						
1,1,1-Trichloroethane						
Carbontetrachloride						
Trichloroethylene	0.74	0.80	0.79	0.74	0.76	0.72
Tetrachloroethylene	0.66	0.83	0.42	0.53	0.21	0.26
1,4-Dichlorobenzene						

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	5-Dec-87	23-Dec-87	29-Dec-87	4-Jan-88	10-Jan-88	16-Jan-88
C2	24.21					
Propylene	0.86	1.26	0.57	0.59	0.85	0.66
Propane	1.05	4.10	1.26	1.60	2.61	2.40
1-Propyne		0.12	0.05	0.06	0.11	0.05
Isobutane	1.10	1.35	0.34	0.50	0.67	0.92
1-Butene/Isobutene	1.60	2.71	2.57	1.75	2.17	2.25
1,3-Butadiene	0.18	0.19	0.08	0.09	0.14	0.11
Butane	6.12	5.12	1.56	1.84	2.72	4.20
trans-2-Butene	0.62	0.38	0.14	0.02	0.24	0.11
2,2-Dimethylpropane		ND	ND	ND	ND	ND
1-Butyne		ND	ND	ND	ND	ND
cis-2-Butene	0.20	0.19	0.07	0.08	0.12	0.07
2-Methyl-1-butene	0.12	0.05	0.02	0.03	0.04	0.02
Isopentane	4.98	4.02	2.12	2.13	2.84	2.66
1-Pentene	0.07	0.12	0.16	0.15	0.09	0.03
2-Methyl-1-pentene		0.20	0.08	ND	ND	0.19
Pentane	1.29	2.51	1.13	1.14	1.76	1.48
Isoprene	0.07	3.01	1.27	1.24	0.68	1.59
trans-2-Pentene	0.16	0.22	0.09	0.10	0.14	0.10
cis-2-Pentene	0.06	0.09	0.04	0.04	0.07	0.04
2-Methyl-2-butene	0.26	0.33	0.14	ND	0.23	0.18
2,2-Dimethylbutane	0.20	0.25	0.13	0.13	0.13	0.14
3-Methyl-1-pentene	2.86	0.10	0.14	0.10	0.06	0.09
Cyclopentane	0.11	0.20	0.08	0.14	0.14	0.10
2,3-Dimethylbutane	0.18	0.32	0.15	0.14	0.22	0.15
2-Methylpentane	1.52	1.48	0.93	0.87	0.93	0.90
3-Methylpentane	0.41	0.73	0.33	0.35	0.59	0.38
1-Hexene	0.11	0.16	0.06	0.11	0.11	0.21
Hexane	0.49	1.05	0.46	0.49	0.81	0.67
trans-2-Hexene		0.05	0.04	0.02	0.05	0.07
2-Methyl-2-pentene		0.05	0.02	0.02	ND	0.01
trans-3-Methyl-2-pentene		0.03	0.03	0.02	0.05	0.02
cis-2-Hexene		0.02	0.02	0.02	0.02	0.01
cis-3-Methyl-2-pentene		0.03	ND	ND	0.02	0.05
Methylcyclopentane	0.30	0.39	0.18	0.17	0.31	0.20
2,4-Dimethylpentane	0.11	0.15	0.08	0.07	0.12	0.07
Benzene	1.21	1.69	0.63	0.91	1.22	0.76
Cyclohexane	0.09	0.15	0.05	0.09	0.08	0.03
2-Methylhexane	0.61	0.76	0.24	0.24	0.28	2.36
2,3-Dimethylpentane	0.25	0.40	0.13	0.11	0.22	1.03
3-Methylhexane	1.16	1.65	1.11	1.22	0.56	6.41
trans-1,3-Dimethylcyclohexane		0.19	0.03	0.03	0.04	0.86
cis-1,3-Dimethylcyclohexane		0.40	0.09	0.06	0.08	1.84
2,2,4-Trimethylpentane	0.97	0.76	0.30	0.29	0.51	1.73
Heptane		5.48	0.33	0.18	0.34	21.21
t-2-Heptene		0.04	0.04	ND	0.14	0.10
c-2-Heptene		0.10	0.31	0.09	0.11	0.12
Methylcyclohexane		2.99	0.08	0.23	0.09	16.33
2,5-Dimethylhexane	0.58	0.13	0.03	0.03	0.05	0.38
2,4-Dimethylhexane		0.85	0.03	0.07	0.10	3.81
2,3,4-Trimethylpentane	0.14	0.37	0.08	0.06	0.13	0.20
Toluene	3.00	4.33	1.55	1.25	2.39	5.78
2-Methylheptane	0.12	0.19	0.07	0.08	0.11	0.68
4-Methylheptane		0.20	0.23	0.16	0.03	0.18

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	5-Dec-87	23-Dec-87	29-Dec-87	4-Jan-88	10-Jan-88	16-Jan-88
3-Methylheptane	0.18	0.31	0.06	0.04	0.11	0.68
2,2,5-Trimethylhexane		0.36	0.33	0.41	0.07	0.65
Octane	0.12	0.24	0.01	0.04	0.12	0.25
Ethylbenzene	0.27	0.35	0.19	0.13	0.18	0.29
2,3-dimethylheptane		0.07	0.06	0.01	ND	0.19
m,p-Xylene	1.09	1.14	0.73	0.47	0.39	1.32
4-Methyloctane		0.08	0.09	0.06	0.03	0.06
3-Methyloctane		0.04	0.06	0.05	ND	0.13
Styrene	0.21	0.26	0.35	0.31	0.07	0.40
o-Xylene	0.37	0.30	0.29	0.25	0.13	0.28
Nonane	0.06	0.08	0.08	0.06	0.05	0.10
iso-Propylbenzene		0.04	0.05	0.02	0.01	0.22
n-Propylbenzene	0.92	0.13	0.15	0.09	0.05	0.13
4-Ethyltoluene	0.66	0.22	0.23	0.17	0.07	0.30
3-Ethyltoluene		0.12	0.10	0.08	0.05	0.21
1,3,5-Trimethylbenzene	0.22	0.39	0.39	0.05	0.03	0.08
2-Ethyltoluene	ND	0.34	0.39	0.19	0.10	0.69
1,2,4-Trimethylbenzene	1.11	0.98	0.82	0.57	0.38	1.15
Decane	0.16	0.03	0.55	0.04	0.03	0.11
1,2,3-Trimethylbenzene	0.25	0.04	0.03	0.03	0.02	0.07
p-Cymene	0.15	0.26	0.23	0.12	0.23	0.35
Indane		0.13	0.13	0.10	0.05	0.16
1,3-Diethylbenzene/n-Butylbenzen	0.14	0.29	0.22	0.10	0.15	0.37
1,4-Diethylbenzene		0.06	ND	ND	0.03	0.11
1,2-Diethylbenzene		0.20	0.07	0.03	0.05	0.32
Undecane		0.03	0.03	0.02	0.04	0.46
Dodecane	0.38	0.03	0.04	0.02	0.02	0.11
Trichlorofluoromethane		0.23	0.19	0.17	0.19	0.18
Dichloromethane		3.82	2.44	1.95	2.59	2.51
Chloroform		0.08	0.04	0.03	0.11	1.06
1,1,1-Trichloroethane		0.45	0.44	0.29	0.39	0.36
Carbontetrachloride		0.32	0.15	0.13	0.33	0.10
Trichloroethylene	0.65	0.23	0.07	0.03	0.18	0.06
Tetrachloroethylene	0.86	0.20	0.12	0.06	0.09	0.10
1,4-Dichlorobenzene		0.96	1.33	0.43	0.26	1.84

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	22-Jan-88	21-Feb-88	27-Feb-88	10-Mar-88	9-Apr-88	15-Apr-88
C2						
Propylene	0.95	0.77	0.63	0.82	0.69	0.72
Propane	2.05	2.15	2.31	1.79	1.51	2.17
1-Propyne	0.09	0.07	0.06	0.06	0.05	0.05
Isobutane	0.63	1.00	0.66	1.11	0.59	0.72
1-Butene/Isobutene	2.04	1.72	1.32	1.47	0.89	0.85
1,3-Butadiene	0.14	0.17	0.11	0.14	0.06	0.14
Butane	2.57	2.62	4.04	3.78	2.40	3.21
trans-2-Butene	0.14	0.25	0.08	0.10	0.11	0.05
2,2-Dimethylpropane	ND	ND	ND	ND	ND	ND
1-Butyne	ND	ND	ND	ND	ND	ND
cis-2-Butene	0.12	0.14	0.08	0.09	0.07	0.06
2-Methyl-1-butene	0.04	0.05	0.03	0.03	0.02	0.02
Isopentane	3.39	2.19	1.68	2.03	1.65	1.36
1-Pentene	0.23	0.12	0.08	0.09	0.03	0.08
2-Methyl-1-pentene	0.14	0.13	0.10	0.11	0.10	0.09
Pentane	1.98	4.42	1.37	1.23	0.96	0.88
Isoprene	2.12	1.24	0.66	1.20	0.38	ND
trans-2-Pentene	0.16	0.16	0.11	0.13	0.10	0.09
cis-2-Pentene	0.07	0.07	0.04	0.05	0.04	0.04
2-Methyl-2-butene	0.26	0.27	0.17	0.17	0.04	0.04
2,2-Dimethylbutane	0.13	0.17	0.14	0.14	0.10	0.09
3-Methyl-1-pentene	0.15	0.02	0.07	0.11	0.10	0.08
Cyclopentane	0.16	0.14	0.09	0.11	ND	ND
2,3-Dimethylbutane	0.22	0.18	0.15	0.14	0.07	0.06
2-Methylpentane	1.24	1.24	0.88	0.64	0.79	0.69
3-Methylpentane	0.55	0.48	0.39	0.40	0.36	0.32
1-Hexene	0.16	0.09	0.06	0.11	0.11	0.09
Hexane	0.65	0.84	0.63	1.17	0.40	0.37
trans-2-Hexene	0.03	0.05	0.04	0.04	0.04	0.03
2-Methyl-2-pentene	0.02	0.04	0.04	0.03	0.02	0.02
trans-3-Methyl-2-pentene	0.04	0.02	0.04	0.02	0.02	0.01
cis-2-Hexene	0.04	0.01	0.03	0.01	0.01	0.01
cis-3-Methyl-2-pentene	0.04	0.03	0.02	0.02	0.02	0.01
Methylcyclopentane	0.28	0.27	0.22	0.27	0.16	0.16
2,4-Dimethylpentane	0.11	0.10	0.10	0.08	0.08	0.08
Benzene	0.87	0.92	0.87	0.68	0.57	0.59
Cyclohexane	0.08	0.10	0.07	0.07	0.06	0.03
2-Methylhexane	0.48	0.30	0.36	0.24	0.26	0.20
2,3-Dimethylpentane	0.26	0.18	0.18	0.12	0.17	0.15
3-Methylhexane	1.36	0.68	0.94	0.72	0.90	0.59
trans-1,3-Dimethylcyclohexane	0.05	0.13	0.11	0.05	0.02	0.02
cis-1,3-Dimethylcyclohexane	0.14	0.28	0.26	0.39	0.09	0.08
2,2,4-Trimethyipentane	0.58	0.52	0.44	0.34	0.28	0.26
Heptane	1.11	1.15	2.91	0.34	0.18	0.16
t-2-Heptene	0.10	0.09	0.05	0.03	0.03	0.02
c-2-Heptene	0.09	0.16	0.09	0.16	0.03	ND
Methylcyclohexane	0.45	0.51	1.34	0.14	0.04	0.05
2,5-Dimethylhexane	0.23	0.10	0.07	0.04	0.07	0.04
2,4-Dimethylhexane	0.22	0.25	0.42	0.09	ND	ND
2,3,4-Trimethylpentane	0.20	0.17	0.12	0.76	0.41	ND
Toluene	4.70	4.33	2.16	2.19	1.31	1.38
2-Methylheptane	0.19	0.55	0.11	0.12	0.07	0.08
4-Methylheptane	0.09	0.21	0.10	0.03	0.02	0.03

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	22-Jan-88	21-Feb-88	27-Feb-88	10-Mar-88	9-Apr-88	15-Apr-88
3-Methylheptane	0.18	0.77	0.16	0.10	0.07	0.08
2,2,5-Trimethylhexane	0.65	ND	0.28	0.31	0.70	0.35
Octane	0.26	ND	0.15	0.16	0.10	0.09
Ethylbenzene	0.38	0.63	0.24	0.28	0.26	0.22
2,3-dimethylheptane	0.04	0.30	0.09	0.09	0.08	0.05
m,p-Xylene	1.26	2.38	1.12	1.06	0.90	0.77
4-Methyloctane	0.07	0.31	0.12	0.15	0.16	0.09
3-Methyloctane	0.06	0.19	0.10	0.12	0.11	0.03
Styrene	0.13	0.47	0.45	0.54	0.64	0.39
o-Xylene	0.63	1.93			0.48	0.33
Nonane	0.13	0.39	0.22	0.29	0.13	0.10
iso-Propylbenzene	0.18	1.25	0.31	0.33	0.16	0.12
n-Propylbenzene	0.09	1.13	0.42	0.46	0.25	0.09
4-Ethyltoluene	0.52	2.92	1.10	1.12	0.69	0.59
3-Ethyltoluene	0.36	1.15	0.47	0.27	0.29	0.19
1,3,5-Trimethylbenzene	5.25	8.19	2.11	0.15	0.12	0.12
2-Ethyltoluene	0.58	0.95	0.41	0.25	0.33	0.32
1,2,4-Trimethylbenzene	1.70	1.67	1.35	0.91	0.70	0.74
Decane	ND	ND	0.36	0.20	0.11	0.19
1,2,3-Trimethylbenzene	0.44	1.26	0.64	0.25	0.42	0.17
p-Cymene	0.84	1.81	1.44	1.32	0.36	0.39
Indane	1.73	2.74	2.41	1.00	0.40	0.56
1,3-Diethylbenzene/n-Butylbenzen	3.24	7.91	4.28	1.86	0.85	1.05
1,4-Diethylbenzene	0.51	1.15	0.87	0.41	0.07	0.30
1,2-Diethylbenzene	0.93	1.99	2.03	0.77	0.33	0.41
Undecane	0.59	0.84	1.61	0.46	0.11	0.12
Dodecane	0.07	0.09	0.36	0.10	0.08	0.10
Trichlorofluoromethane	0.21	0.47	0.41	0.26	0.23	0.21
Dichloromethane	1.33	1.85	2.36	2.34	0.86	0.65
Chloroform	0.08	0.03	0.12	0.22	0.02	0.03
1,1,1-Trichloroethane	1.77	1.92	0.60	0.46	0.29	0.34
Carbontetrachloride	0.18	0.23	0.51	0.38	0.10	0.13
Trichloroethylene	0.10	0.13	0.13	0.96	0.08	0.09
Tetrachloroethylene	0.27	0.21	0.19	0.24	0.15	0.17
1,4-Dichlorobenzene	1.58	1.31	2.11	1.75	2.06	2.04

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	21-Apr-88	27-Apr-88	3-May-88	9-May-88	15-May-88	21-May-88
C2						
Propylene	0.62	0.46	0.42	0.54	0.13	0.54
Propane	1.89	1.79	1.47	1.63	0.61	1.97
1-Propyne	0.07	0.03	0.03	0.04	0.12	0.13
Isobutane	0.64	0.59	0.69	1.12	0.26	0.53
1-Butene/Isobutene	0.81	0.71	0.35	1.16	1.09	1.63
1,3-Butadiene	0.14	0.08	0.04	0.06	0.06	0.09
Butane	2.43	2.73	2.24	7.31	16.78	15.61
trans-2-Butene	0.06	0.09	0.07	0.26	0.45	0.35
2,2-Dimethylpropane	ND	ND	ND	ND	ND	ND
1-Butyne	ND	ND	ND	ND	ND	ND
cis-2-Butene	0.07	0.05	0.05	0.09	0.14	0.17
2-Methyl-1-butene	0.03	0.02	0.02	0.02	0.03	0.06
Isopentane	1.63	1.17	1.55	1.49	2.93	5.37
1-Pentene	0.07	0.07	0.06	0.07	0.12	0.14
2-Methyl-1-pentene	0.10	0.06	0.07	0.06	0.08	0.15
Pentane	1.01	0.80	1.06	1.03	2.25	3.29
Isoprene	0.59	0.67	0.76	0.04	0.05	0.07
trans-2-Pentene	0.11	0.07	0.09	0.13	0.18	0.21
cis-2-Pentene	0.05	0.03	0.03	0.03	0.05	0.08
2-Methyl-2-butene	0.14	0.11	0.12	0.19	0.33	0.42
2,2-Dimethylbutane	0.10	0.07	0.09	0.11	0.28	0.30
3-Methyl-1-pentene	0.06	0.05	0.05	0.17	0.09	0.03
Cyclopentane	ND	0.07	0.09	0.09	0.15	0.29
2,3-Dimethylbutane	0.07	0.09	0.12	0.10	0.19	0.38
2-Methylpentane	0.67	0.58	0.63	1.17	1.25	1.99
3-Methylpentane	0.36	0.28	0.32	0.41	0.67	1.28
1-Hexene	0.09	0.06	0.08	0.06	0.36	0.13
Hexane	0.41	0.42	0.40	0.46	0.76	2.30
trans-2-Hexene	0.04	0.03	0.02	0.03	0.07	0.06
2-Methyl-2-pentene	0.03	0.03	0.02	0.02	0.04	0.07
trans-3-Methyl-2-pentene	0.02	0.01	0.01	ND	0.03	0.04
cis-2-Hexene	0.02	0.00	0.00	ND	0.01	0.01
cis-3-Methyl-2-pentene	0.02	0.01	0.01	0.02	0.07	0.05
Methylcyclopentane	0.18	0.13	0.14	0.15	0.36	0.70
2,4-Dimethylpentane	0.10	0.04	0.07	0.06	0.13	0.23
Benzene	0.66	0.51	0.50	0.69	1.30	2.13
Cyclohexane	0.04	0.06	0.02	0.06	0.14	0.29
2-Methylhexane	0.18	0.25	0.22	0.39	0.34	0.79
2,3-Dimethylpentane	0.16	0.11	0.15	0.14	0.15	0.41
3-Methylhexane	0.46	0.47	0.56	1.50	1.02	2.17
trans-1,3-Dimethylcyclohexane	0.03	0.01	0.01	0.07	0.03	0.22
cis-1,3-Dimethylcyclohexane	0.09	0.04	0.12	0.18	0.25	0.46
2,2,4-Trimethylpentane	0.31	0.16	0.00	0.30	0.40	0.89
Heptane	0.15	0.12	0.18	1.63	0.55	6.58
t-2-Heptene	ND	0.02	0.03	0.16	0.11	0.11
c-2-Heptene	0.02	0.02	0.04	0.06	0.10	0.12
Methylcyclohexane	0.07	0.05	0.08	1.19	0.15	3.51
2,5-Dimethylhexane	0.07	0.02	0.06	0.03	0.18	0.15
2,4-Dimethylhexane	ND	0.03	ND	0.26	0.12	1.03
2,3,4-Trimethylpentane	0.09	0.16	0.07	0.04	0.08	0.17
Toluene	2.02	1.05	1.52	4.77	2.70	6.44
2-Methylheptane	0.08	0.06	0.12	0.12	0.11	0.27
4-Methylheptane	0.02	0.02	0.05	0.03	0.03	0.23

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	21-Apr-88	27-Apr-88	3-May-88	9-May-88	15-May-88	21-May-88
3-Methylheptane	0.07	0.05	0.23	0.04	0.11	0.33
2,2,5-Trimethylhexane	0.22	0.22	0.25	0.23	0.50	0.58
Octane	0.08	0.08	0.08	0.05	0.19	0.25
Ethylbenzene	0.26	0.21	0.30	0.13	0.43	0.49
2,3-dimethylheptane	0.06	0.09	0.11	ND	0.06	0.08
m,p-Xylene	0.90	0.73	1.01	0.29	1.56	1.42
4-Methyloctane	0.09	0.30	0.25	0.02	0.09	0.06
3-Methyloctane	0.05	0.23	0.14	ND	0.04	0.04
Styrene	0.44		0.55	0.04	0.81	0.35
o-Xylene	0.60	0.27	0.47	0.07	0.51	0.38
Nonane	0.12	0.07	0.10		0.23	0.30
iso-Propylbenzene	0.11	0.10	0.31	0.01	0.13	0.12
n-Propylbenzene	0.09	0.05	0.30	ND	0.12	0.13
4-Ethyltoluene	0.55	0.38	1.05	0.03	0.43	0.36
3-Ethyltoluene	0.18	0.12	0.27	0.02	0.12	0.21
1,3,5-Trimethylbenzene	0.11	0.54	0.11	0.02	0.21	0.10
2-Ethyltoluene	0.31	0.13	0.45	0.01	0.26	0.27
1,2,4-Trimethylbenzene	0.67	0.59	1.25	0.03	0.35	0.35
Decane	0.12	0.09	0.32	ND	0.04	0.02
1,2,3-Trimethylbenzene	0.12	0.09	0.70	ND	0.21	0.06
p-Cymene	0.40	0.37	ND	0.02	0.16	0.14
Indane	0.59	0.49	2.15	0.02	0.09	0.11
1,3-Diethylbenzene/n-Butylbenzen	1.22	0.97	0.49	0.05	0.27	0.26
1,4-Diethylbenzene	0.28	0.23	0.73	ND	0.08	0.04
1,2-Diethylbenzene	0.46	0.40	1.72	0.02	0.10	0.14
Undecane	0.34	0.12	0.86	ND	0.06	0.02
Dodecane	0.11	0.11	0.18	0.03	0.05	0.04
Trichlorofluoromethane	0.22	0.24	0.26	0.24	0.28	0.35
Dichloromethane	0.63	0.77	0.56	1.36	1.28	1.88
Chloroform	0.03	0.02	0.03	0.03	0.05	0.07
1,1,1-Trichloroethane	0.32	0.34	0.86	0.35	0.44	0.43
Carbontetrachloride	0.15	0.21	0.19	0.14	0.21	0.20
Trichloroethylene	0.11	0.07	0.02	0.15	0.10	0.24
Tetrachloroethylene	0.13	0.10	0.33	0.14	0.21	0.29
1,4-Dichlorobenzene	1.88	2.40	3.91	0.20	1.66	1.94

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	27-May-88	2-Jun-88	8-Jun-88	14-Jun-88	20-Jun-88	26-Jun-88
C2						
Propylene	0.13	0.36	0.59	0.38	0.66	0.73
Propane	0.98	0.73	0.94	1.46	4.85	1.57
1-Propyne	ND	0.03	0.05	0.06	0.07	0.07
Isobutane	0.10	0.30	0.81	0.81	1.72	1.16
1-Butene/Isobutene	0.87	0.86	0.98	1.35	1.47	1.00
1,3-Butadiene	0.03	0.07	0.12	0.16	0.09	0.13
Butane	17.55	11.66	1.96	3.09	5.38	3.46
trans-2-Butene	0.13	0.08	0.08	0.23	0.12	0.13
2,2-Dimethylpropane	ND	ND	ND	ND	0.02	0.02
1-Butyne	ND	ND	ND	ND	ND	ND
cis-2-Butene	ND	ND	ND	ND	0.10	0.10
2-Methyl-1-butene	0.03	0.02	0.03	0.06	0.04	0.03
Isopentane	2.80	1.49	2.06	5.61	3.35	2.79
1-Pentene	0.09	0.08	0.09	0.16	0.10	0.08
2-Methyl-1-pentene	0.06	0.04	0.06	0.12	0.05	0.04
Pentane	1.71	1.47	1.16	3.07	2.75	2.08
Isoprene	0.08	0.05	0.06	0.23	0.19	0.12
trans-2-Pentene	0.11	0.08	0.10	0.21	0.13	0.13
cis-2-Pentene	0.05	0.03	0.04	0.09	0.04	0.06
2-Methyl-2-butene	0.27	0.19	0.12	0.31	0.20	0.23
2,2-Dimethylbutane	0.17	0.11	0.13	0.25	0.18	0.15
3-Methyl-1-pentene	0.02	0.10	0.09	0.12	0.21	0.12
Cyclopentane	0.14	0.10	0.11	0.27	0.17	0.16
2,3-Dimethylbutane	0.20	0.13	0.15	0.40	0.24	0.19
2-Methylpentane	1.04	0.83	0.90	1.89	1.35	1.08
3-Methylpentane	0.58	0.41	0.44	1.18	0.92	0.54
1-Hexene	0.07	0.06	0.04	0.08	0.07	0.06
Hexane	0.88	0.43	0.53	1.71	1.78	0.65
trans-2-Hexene	0.03	0.01	0.02	0.05	0.05	0.04
2-Methyl-2-pentene	0.03	0.02	0.01	0.05	0.07	0.05
trans-3-Methyl-2-pentene	0.02	0.01	0.01	0.02	0.01	0.01
cis-2-Hexene	0.02	ND	0.02	0.01	0.01	0.01
cis-3-Methyl-2-pentene	0.04	0.02	0.02	0.01	0.02	0.05
Methylcyclopentane	0.30	0.16	0.22	0.61	0.53	0.26
2,4-Dimethylpentane	0.10	0.08	0.07	0.20	0.11	0.10
Benzene	1.47	0.52	0.70	2.08	1.02	0.71
Cyclohexane	0.06	0.06	0.41	0.19	0.08	0.10
2-Methylhexane	0.23	0.21	0.16	0.64	0.23	0.24
2,3-Dimethylpentane	0.16	0.11	0.10	0.33	0.17	0.16
3-Methylhexane	0.70	0.95	0.68	1.47	0.87	0.61
trans-1,3-Dimethylcyclohexane	0.04	0.04	0.02	0.15	0.03	0.04
cis-1,3-Dimethylcyclohexane	0.08	0.12	0.01	0.29	0.05	0.08
2,2,4-Trimethylpentane	0.40	0.29	0.23	0.74	0.61	0.51
Heptane	0.83	1.47	0.20	4.03	0.37	0.84
t-2-Heptene	0.04	0.06	0.03	0.05	0.06	0.06
c-2-Heptene	0.06	0.05	0.06	0.07	0.09	0.05
Methylcyclohexane	0.31	0.70	0.09	2.18	0.11	0.35
2,5-Dimethylhexane	0.04	0.04	0.03	0.12	0.06	0.05
2,4-Dimethylhexane	0.13	0.22	0.07	0.63	0.10	0.18
2,3,4-Trimethylpentane	0.07	0.07	0.09	0.19	0.32	0.11
Toluene	2.28	2.18	2.04	9.19	2.44	3.14
2-Methylheptane	0.11	0.08	0.10	0.25	0.18	0.12
4-Methylheptane	0.04	0.05	0.06	0.18	ND	0.04

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	27-May-88	2-Jun-88	8-Jun-88	14-Jun-88	20-Jun-88	26-Jun-88
3-Methylheptane	0.10	0.09	0.08	0.30	0.11	0.10
2,2,5-Trimethylhexane	0.46	0.66	0.36	0.35	0.53	0.25
Octane	0.12	0.10	0.09	0.26	0.13	0.14
Ethylbenzene	0.20	0.18	0.24	1.02	0.30	0.40
2,3-dimethylheptane	0.04	0.10	0.10	0.16	0.08	0.05
m,p-Xylene	0.49	0.54	0.81	3.37	0.99	1.23
4-Methyloctane	0.03	0.06	0.08	0.16	0.09	0.06
3-Methyloctane	0.00	0.02	0.01	0.08	0.02	0.01
Styrene	0.26	0.31	0.31	0.37	0.53	0.26
o-Xylene	0.14	0.15	0.36	0.95	0.39	0.38
Nonane	0.16	0.12	0.26	0.34	0.33	0.23
iso-Propylbenzene	0.02	0.07	0.25	0.51	0.16	0.38
n-Propylbenzene	0.06	0.05	0.28	ND	0.12	0.10
4-Ethyltoluene	0.15	0.24	0.93	1.11	0.85	0.43
3-Ethyltoluene	0.11	0.10	0.19	0.35	0.22	0.20
1,3,5-Trimethylbenzene	0.05	0.04	0.12	0.26	0.14	0.13
2-Ethyltoluene	0.14	0.11	0.31	0.74	0.32	0.25
1,2,4-Trimethylbenzene	0.28	0.21	0.20	0.55	0.70	0.63
Decane	0.04	0.03	0.10	0.29	0.16	0.17
1,2,3-Trimethylbenzene	0.05	0.04	0.11	0.23	0.18	0.17
p-Cymene	0.14	0.15	0.18	0.46	0.51	ND
Indane	0.11	0.14	0.15	0.40	0.55	0.41
1,3-Diethylbenzene/n-Butylbenzen	0.24	0.22	0.74	0.79	1.05	0.83
1,4-Diethylbenzene	0.05	0.07	0.05	0.16	0.10	0.15
1,2-Diethylbenzene	0.11	0.15	0.18	0.43	0.54	0.59
Undecane	0.02	0.17	0.10	0.25	0.40	0.56
Dodecane	0.01	0.04	0.06	0.13	0.44	0.64
Trichlorofluoromethane	0.24	0.24	0.22	0.25	0.26	0.25
Dichloromethane	1.03	0.85	0.72	0.98	0.85	0.61
Chloroform	0.03	0.03	0.03	0.05	0.04	0.03
1,1,1-Trichloroethane	0.36	0.31	0.40	0.43	0.50	0.39
Carbontetrachloride	0.19	0.10	0.13	0.15	0.24	0.42
Trichloroethylene	0.21	0.07	0.07	0.26	0.18	0.17
Tetrachloroethylene	0.12	0.27	0.20	0.27	0.11	0.17
1,4-Dichlorobenzene	1.19	1.48	2.07	3.03	3.59	2.71

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	2-Jul-88	8-Jul-88	14-Jul-88	20-Jul-88	26-Jul-88	1-Aug-88
C2						
Propylene	1.77	1.05	0.70	0.80	0.72	0.39
Propane	5.05	2.88	1.58	2.47	1.77	1.47
1-Propyne	0.29	0.22	0.08	ND	0.17	0.05
Isobutane	2.41	2.25	1.07	0.94	1.36	1.37
1-Butene/Isobutene	2.08	1.92	1.20	1.83	1.47	1.06
1,3-Butadiene	0.45	0.24	0.13	0.50	0.20	0.06
Butane	12.45	14.39	6.31	6.32	7.25	4.43
trans-2-Butene	0.42	0.27	0.16	0.25	0.18	0.12
2,2-Dimethylpropane	ND	0.06	ND	0.03	0.03	0.03
1-Butyne	0.01	ND	ND	ND	ND	ND
cis-2-Butene	0.40	0.23	0.18	0.22	0.17	0.10
2-Methyl-1-butene	0.14	0.13	0.06	0.07	0.07	0.04
Isopentane	10.24	10.31	4.50	5.04	5.41	3.45
1-Pentene	0.35	0.30	0.13	0.16	0.17	0.11
2-Methyl-1-pentene	0.40	0.21	0.12	0.17	0.14	0.07
Pentane	5.16	5.20	2.48	2.78	2.72	1.91
Isoprene	0.31	0.18	0.28	0.13	0.11	0.41
trans-2-Pentene	0.65	0.34	0.22	0.26	0.23	0.13
cis-2-Pentene	0.32	0.16	0.09	0.13	0.11	0.05
2-Methyl-2-butene	1.05	0.52	0.30	0.42	0.35	0.18
2,2-Dimethylbutane	0.43	0.40	0.20	0.22	0.30	0.38
3-Methyl-1-pentene	0.04	0.04	0.02	0.03	0.04	0.20
Cyclopentane	0.48	0.48	0.21	0.27	0.24	0.18
2,3-Dimethylbutane	0.81	0.77	0.27	0.37	0.41	0.22
2-Methylpentane	3.23	3.06	1.32	1.64	1.84	1.14
3-Methylpentane	1.98	1.87	0.74	0.92	1.03	0.60
1-Hexene	0.25	0.16	0.09	0.11	0.11	0.07
Hexane	2.05	2.69	0.90	1.12	1.19	1.25
trans-2-Hexene	0.18	0.09	0.05	0.07	0.05	0.04
2-Methyl-2-pentene	0.21	0.08	0.06	0.09	0.08	0.04
trans-3-Methyl-2-pentene	0.15	0.04	0.03	0.04	0.02	ND
cis-2-Hexene	0.02	0.03	0.02	0.02	0.02	ND
cis-3-Methyl-2-pentene	0.20	0.07	0.07	0.08	0.05	0.02
Methylcyclopentane	1.00	1.05	0.37	0.46	0.50	0.34
2,4-Dimethylpentane	0.50	0.48	0.13	0.19	0.24	0.12
Benzene	2.55	2.12	1.07	1.36	1.45	0.71
Cyclohexane	0.27	0.25	0.19	1.04	0.12	0.10
2-Methylhexane	0.84	0.74	0.24	0.37	0.44	0.26
2,3-Dimethylpentane	0.71	0.72	0.17	0.29	0.37	0.16
3-Methylhexane	1.30	1.48	0.79	0.80	0.97	1.05
trans-1,3-Dimethylcyclohexane	0.14	0.16	0.04	0.05	0.08	0.06
cis-1,3-Dimethylcyclohexane	0.22	0.27	0.08	0.10	0.13	0.13
2,2,4-Trimethylpentane	1.43	1.38	0.46	1.09	0.90	0.44
Heptane	0.76	0.91	0.32	0.36	1.21	1.51
t-2-Heptene	0.07	0.07	0.08	0.09	0.08	0.08
c-2-Heptene	0.10	0.08	0.08	0.07	0.08	0.08
Methylcyclohexane	0.38	0.46	0.14	0.20	0.51	0.62
2,5-Dimethylhexane	0.17	0.16	0.06	0.12	0.11	0.05
2,4-Dimethylhexane	0.32	0.33	0.12	0.22	0.27	0.21
2,3,4-Trimethylpentane	0.47	0.37	0.11	0.23	0.26	0.10
Toluene	7.39	7.31	2.28	4.12	4.59	3.10
2-Methylheptane	0.32	0.39	0.07	0.07	0.24	0.14
4-Methylheptane	0.33	0.10	ND	ND	0.11	0.08

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	2-Jul-88	8-Jul-88	14-Jul-88	20-Jul-88	26-Jul-88	1-Aug-88
3-Methylheptane	0.65	0.36	0.10	0.16	0.26	0.24
2,2,5-Trimethylhexane	0.35	0.46	0.36	0.25	0.31	0.46
Octane	0.24	0.53	0.11	0.21	0.22	0.18
Ethylbenzene	1.08	1.17	0.40	0.53	0.68	0.37
2,3-dimethylheptane	0.12	0.13	0.07	0.07	0.11	0.06
m,p-Xylene	3.31	3.57	1.04	1.60	2.18	1.20
4-Methyloctane	0.16	0.17	0.06	0.09	0.10	0.06
3-Methyloctane	0.03	0.03	0.01	0.01	0.02	0.01
Styrene	0.53	0.50	0.35	0.26	0.02	0.32
o-Xylene	1.12	1.13	0.35	0.54	0.71	0.37
Nonane	0.54	0.65	0.38	0.42	0.47	0.46
iso-Propylbenzene	0.21	0.34	0.10	0.23	0.30	0.08
n-Propylbenzene	0.25	0.22	0.10	0.14	0.15	0.10
4-Ethyltoluene	0.98	0.96	0.48	0.69	0.68	0.45
3-Ethyltoluene	0.54	0.50	0.24	0.32	0.33	0.22
1,3,5-Trimethylbenzene	0.41	0.35	0.12	0.22	0.23	0.13
2-Ethyltoluene	0.39	0.30	0.22	0.35	0.05	0.10
1,2,4-Trimethylbenzene	0.90	1.10	0.52	0.88	0.86	0.70
Decane	0.37	0.61	0.18	0.26	0.51	0.20
1,2,3-Trimethylbenzene	0.23	0.25	0.26	0.22	0.21	0.12
p-Cymene	0.32	0.69	0.61	0.62	0.74	0.21
Indane	0.33	0.62	0.72	0.73	0.71	0.19
1,3-Diethylbenzene/n-Butylbenzen	0.51	1.22	1.48	1.43	1.35	0.38
1,4-Diethylbenzene	0.22	0.49	0.11	0.19	0.25	0.13
1,2-Diethylbenzene	0.20	0.63	0.76	0.87	1.03	0.45
Undecane	0.02	0.23	0.46	0.23	0.60	0.27
Dodecane	0.16	0.23	0.19	0.28	0.42	0.19
Trichlorofluoromethane	0.31	0.42	0.23	0.23	0.34	0.25
Dichloromethane	1.08	1.52	0.83	1.20	1.29	1.36
Chloroform	0.10	0.06	0.03	0.22	0.84	0.05
1,1,1-Trichloroethane	0.46	0.69	0.43	0.45	0.77	0.34
Carbontetrachloride	0.37	0.19	0.23	0.25	0.33	0.18
Trichloroethylene	0.47	0.18	0.10	0.09	0.26	0.07
Tetrachloroethylene	0.25	0.36	0.19	0.41	0.73	0.09
1,4-Dichlorobenzene	1.74	2.25	2.26	2.80	2.58	2.15

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	7-Aug-88	13-Aug-88	19-Aug-88	25-Aug-88	31-Aug-88	6-Sep-88
C2						
Propylene	0.45	0.95	0.40	0.95	0.81	0.67
Propane	0.81	2.84	0.92	1.87	2.14	1.27
1-Propyne	0.06	0.09	0.07	0.17	0.17	0.10
Isobutane	1.33	1.61	0.52	0.97	1.19	0.66
1-Butene/Isobutene	1.16	1.43	1.10	1.51	1.62	1.00
1,3-Butadiene	0.08	0.18	0.11	0.27	0.26	0.18
Butane	3.78	8.55	3.25	4.96	8.23	3.11
trans-2-Butene	0.10	0.25	0.13	0.26	0.34	0.13
2,2-Dimethylpropane	ND	ND	ND	ND	ND	ND
1-Butyne	ND	ND	ND	ND	0.01	ND
cis-2-Butene	0.10	0.31	0.11	0.24	0.31	0.15
2-Methyl-1-butene	0.03	0.08	0.04	0.07	0.09	0.04
Isopentane	2.69	6.28	2.72	4.37	6.23	2.40
1-Pentene	0.10	0.23	0.10	0.17	0.23	0.10
2-Methyl-1-pentene	0.05	0.08	0.04	0.09	0.20	0.08
Pentane	1.49	3.16	1.53	2.44	3.29	1.33
Isoprene	0.10	0.31	0.07	0.17	0.18	0.08
trans-2-Pentene	0.15	0.37	0.17	0.36	0.46	0.16
cis-2-Pentene	0.05	0.13	0.07	0.15	0.17	0.08
2-Methyl-2-butene	0.20	0.57	0.29	0.61	0.71	0.28
2,2-Dimethylbutane	0.33	0.41	0.29	0.20	0.26	0.09
3-Methyl-1-pentene	ND	0.04	ND	0.03	0.03	0.03
Cyclopentane	0.11	0.28	0.14	0.27	0.37	0.14
2,3-Dimethylbutane	0.18	0.41	0.19	0.34	0.50	0.24
2-Methylpentane	0.98	2.15	1.05	1.58	1.95	0.85
3-Methylpentane	0.49	1.27	0.58	0.90	1.22	0.49
1-Hexene	0.08	0.09	0.07	0.11	0.16	0.09
Hexane	0.59	1.80	0.83	0.93	1.47	0.63
trans-2-Hexene	0.05	0.06	0.04	0.09	0.10	0.03
2-Methyl-2-pentene	0.08	0.08	0.06	0.14	0.12	0.05
trans-3-Methyl-2-pentene	0.01	0.04	0.02	0.07	0.08	0.03
cis-2-Hexene	0.01	0.02	0.01	0.01	0.02	0.02
cis-3-Methyl-2-pentene	0.03	0.07	0.04	0.10	0.08	0.04
Methylcyclopentane	0.23	0.67	0.30	0.43	0.63	0.29
2,4-Dimethylpentane	0.13	0.21	[illegible]	0.19	0.26	0.16
Benzene	0.71	2.09	0.76	1.10	2.30	0.82
Cyclohexane	0.14	0.31	0.16	0.17	0.13	0.07
2-Methylhexane	1.02	0.49	0.32	1.02	0.59	0.50
2,3-Dimethylpentane	0.52	0.30	0.21	0.52	0.41	0.28
3-Methylhexane	3.16	1.23	1.02	3.42	1.84	1.30
trans-1,3-Dimethylcyclohexane	0.38	0.11	0.07	0.34	0.13	0.16
cis-1,3-Dimethylcyclohexane	0.87	0.21	0.14	0.72	0.28	0.35
2,2,4-Trimethylpentane	1.16	0.71	0.53	1.20	0.81	0.70
Heptane	10.92	2.42	2.01	7.73	2.76	4.55
t-2-Heptene	0.11	1.24	0.12	0.16	0.08	0.15
c-2-Heptene	0.08	0.07	0.06	0.08	0.07	0.04
Methylcyclohexane	7.02	1.35	0.83	5.42	1.45	2.56
2,5-Dimethylhexane	0.23	0.09	0.07	0.18	0.14	0.10
2,4-Dimethylhexane	1.91	0.42	0.30	1.48	0.51	0.76
2,3,4-Trimethylpentane	0.14	0.15	0.12	0.23	0.24	0.15
Toluene	4.28	4.54	3.28	7.66	9.23	3.63
2-Methylheptane	0.15	0.13	0.13	0.28	0.33	0.15
4-Methylheptane	0.37	0.06	0.08	0.35	0.22	0.20

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	7-Aug-88	13-Aug-88	19-Aug-88	25-Aug-88	31-Aug-88	6-Sep-88
3-Methylheptane	0.37	0.19	0.13	0.42	0.33	0.24
2,2,5-Trimethylhexane	0.39	0.33	0.35	0.75	0.75	0.21
Octane	0.21	0.20	0.14	0.28	0.29	0.17
Ethylbenzene	0.33	0.59	0.31	0.94	1.19	0.39
2,3-dimethylheptane	0.13	0.08	0.07	0.15	0.13	0.09
m,p-Xylene	1.38	1.91	1.07	3.22	3.96	1.52
4-Methyloctane	0.08	0.07	0.05	0.10	0.16	ND
3-Methyloctane	0.12	0.03	0.02	0.09	0.11	0.16
Styrene	0.34	0.23	0.31	0.66	0.17	0.23
o-Xylene	0.32	0.60	0.34	0.90	1.66	0.48
Nonane	0.73	0.25	0.20	0.37	0.43	0.24
iso-Propylbenzene	0.24	0.14	0.11	0.18	0.19	0.22
n-Propylbenzene	0.05	0.12	0.11	0.15	0.24	0.11
4-Ethyltoluene	0.22	0.41	0.39	0.54	0.73	0.40
3-Ethyltoluene	0.16	0.22	0.19	0.32	0.44	0.23
1,3,5-Trimethylbenzene	0.08	0.16	0.15	0.24	0.36	0.17
2-Ethyltoluene	0.67	0.19	0.17	0.41	0.36	0.26
1,2,4-Trimethylbenzene	0.58	0.89	0.69	0.95	1.22	0.57
Decane	0.16	0.30	0.17	0.24	0.46	0.09
1,2,3-Trimethylbenzene	0.13	0.13	0.09	0.17	0.20	0.10
p-Cymene	ND	0.48	0.39	0.51	0.60	0.45
Indane	0.16	0.37	0.33	0.32	0.39	0.22
1,3-Diethylbenzene/n-Butylbenzen	0.43	0.73	0.76	0.71	0.85	0.50
1,4-Diethylbenzene	0.11	0.28	0.15	0.21	0.40	0.20
1,2-Diethylbenzene	0.75	0.66	0.51	0.93	0.67	0.68
Undecane	0.34	1.02	0.35	0.17	1.82	0.44
Dodecane	0.27	0.67	0.32	0.28	0.89	0.34
Trichlorofluoromethane	0.29	0.31	0.31	0.29	0.29	0.25
Dichloromethane	1.45	1.45	1.34	1.98	1.33	1.01
Chloroform	0.19	0.08	0.06	0.04	0.05	0.05
1,1,1-Trichloroethane	0.37	0.53	0.48	0.37	0.48	0.29
Carbontetrachloride	0.55	0.20	0.21	0.15	0.16	0
Trichloroethylene	0.99	0.29	0.20	0.14	0.11	0.10
Tetrachloroethylene	0.13	0.17	0.34	0.19	0.22	0.16
1,4-Dichlorobenzene	2.39	2.66	1.67	1.15	1.40	1.14

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	12-Sep-88	18-Sep-88	24-Sep-88	30-Sep-88
C2				
Propylene	0.62	0.72	0.81	1.11
Propane	1.69	2.10	1.45	3.49
1-Propyne	0.10	0.09	0.11	0.20
Isobutane	1.21	0.92	0.60	1.59
1-Butene/Isobutene	1.43	0.96	1.03	1.53
1,3-Butadiene	0.16	0.12	0.19	0.31
Butane	4.40	5.25	3.86	8.05
trans-2-Butene	0.18	0.13	0.14	0.48
2,2-Dimethylpropane	0.02	ND	ND	ND
1-Butyne	ND	ND	ND	0.01
cis-2-Butene	0.12	0.12	0.14	0.31
2-Methyl-1-butene	0.04	0.05	0.05	0.08
Isopentane	3.61	3.84	2.98	6.76
1-Pentene	0.11	0.12	0.12	0.20
2-Methyl-1-pentene	0.07	0.06	0.06	0.13
Pentane	2.12	2.13	1.70	3.98
Isoprene	0.12	0.15	0.07	0.20
trans-2-Pentene	0.18	0.18	0.18	0.38
cis-2-Pentene	0.08	0.08	0.09	0.18
2-Methyl-2-butene	0.34	0.36	0.35	0.78
2,2-Dimethylbutane	0.20	0.27	0.21	0.30
3-Methyl-1-pentene	0.02	0.12	0.02	0.03
Cyclopentane	0.23	0.19	0.16	0.39
2,3-Dimethylbutane	0.28	0.26	0.25	0.48
2-Methylpentane	1.23	1.26	1.02	2.23
3-Methylpentane	0.71	0.86	0.57	1.74
1-Hexene	0.07	0.08	0.08	0.13
Hexane	1.16	1.64	0.67	3.11
trans-2-Hexene	0.07	0.07	0.06	0.11
2-Methyl-2-pentene	0.09	0.10	0.07	0.15
trans-3-Methyl-2-pentene	0.03	0.03	0.03	0.09
cis-2-Hexene	0.01	0.02	0.02	0.02
cis-3-Methyl-2-pentene	0.05	0.04	0.08	0.12
Methylcyclopentane	0.38	0.56	0.31	1.08
2,4-Dimethylpentane	0.17	0.16	0.16	0.27
Benzene	0.89	1.29	0.89	2.06
Cyclohexane	0.09	0.19	0.07	0.16
2-Methylhexane	0.30	0.29	0.25	0.52
2,3-Dimethylpentane	0.24	0.23	0.22	0.34
3-Methylhexane	0.73	0.89	0.91	0.99
trans-1,3-Dimethylcyclohexane	0.05	0.07	0.04	0.10
cis-1,3-Dimethylcyclohexane	0.12	0.13	0.12	0.20
2,2,4-Trimethylpentane	0.56	0.47	0.49	0.79
Heptane	0.71	1.62	0.26	0.72
t-2-Heptene	0.04	0.04	0.04	0.03
c-2-Heptene	0.04	0.05	0.05	0.06
Methylcyclohexane	0.27	0.30	0.17	0.57
2,5-Dimethylhexane	0.08	0.08	0.06	0.12
2,4-Dimethylhexane	0.18	0.24	0.13	0.29
2,3,4-Trimethylpentane	0.16	0.12	0.16	0.25
Toluene	5.29	2.82	2.69	9.22
2-Methylheptane	0.22	0.11	0.17	0.37
4-Methylheptane	0.09	0.03	0.07	0.20

Table E3 : VOC Concentrations (ppbv) by Sampling Day - Windsor

Compounds	12-Sep-88	18-Sep-88	24-Sep-88	30-Sep-88
3-Methylheptane	0.19	0.11	0.16	0.34
2,2,5-Trimethylhexane	0.24	0.30	0.46	0.33
Octane	0.18	0.12	0.16	0.31
Ethylbenzene	0.64	0.30	0.52	1.16
2,3-dimethylheptane	0.06	0.04	0.07	0.08
m,p-Xylene	2.08	1.02	1.63	3.84
4-Methyloctane	0.07	0.05	0.07	0.12
3-Methyloctane	0.01	0.01	0.01	0.02
Styrene	0.21	0.28	0.43	0.16
o-Xylene	0.67	0.33	0.57	1.23
Nonane	0.40	0.26	0.36	0.50
iso-Propylbenzene	0.10	0.12	0.19	0.34
n-Propylbenzene	0.18	0.06	0.18	0.26
4-Ethyltoluene	0.67	0.31	0.65	1.15
3-Ethyltoluene	0.37	0.15	0.36	0.55
1,3,5-Trimethylbenzene	0.34	0.12	0.33	0.54
2-Ethyltoluene	0.33	0.10	0.27	0.35
1,2,4-Trimethylbenzene	0.97	0.65	0.87	1.67
Decane	0.27	0.17	0.32	0.38
1,2,3-Trimethylbenzene	0.12	0.08	0.10	0.16
p-Cymene	0.52	0.32	0.41	0.67
Indane	0.31	0.26	0.26	0.45
1,3-Diethylbenzene/n-Butylbenzen	0.53	0.44	0.58	0.92
1,4-Diethylbenzene	0.30	0.22	0.32	0.51
1,2-Diethylbenzene	0.40	0.32	0.34	0.51
Undecane	0.27	0.22	0.24	0.54
Dodecane	0.18	0.27	0.13	0.28
Trichlorofluoromethane	0.30	0.28	0.43	0.35
Dichloromethane	1.36	1.43	1.13	5.66
Chloroform	0.05	0.04	0.08	0.05
1,1,1-Trichloroethane	0.39	0.36	0.42	0.63
Carbontetrachloride	0.24	0.17	0.17	0.22
Trichloroethylene	0.06	0.08	0.12	0.34
Tetrachloroethylene	0.29	0.09	0.24	0.28
1,4-Dichlorobenzene	1.21	1.34	0.66	0.77

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	22-Jan-88	28-Jan-88	9-Feb-88	15-Feb-88	21-Feb-88	27-Feb-88
C2						
Propylene	0.22	0.37	3.53	0.35	0.18	0.35
Propane	1.01	1.31	3.51	1.75	0.92	2.13
1-Propyne	ND	ND	0.14	0.08	0.03	0.04
Isobutane	0.25	0.19	0.61	0.47	0.23	0.74
1-Butene/Isobutene	0.09	0.34	7.53	1.06	0.99	0.60
1,3-Butadiene	ND	ND	0.40	0.04	0.03	0.05
Butane	1.37	1.33	3.49	2.27	2.03	2.31
trans-2-Butene	ND	ND	0.79	0.03	0.03	0.03
2,2-Dimethylpropane	ND	ND	ND	ND	ND	ND
1-Butyne	ND	ND	ND	ND	ND	ND
cis-Butene	ND	ND	0.53	0.02	0.03	0.02
2-Methyl-1-butene	ND	ND	0.04	ND	ND	ND
2-Methylbutae	0.89	1.63	1.10	0.75	0.92	1.08
1-Pentene	0.15	0.26	0.37	0.08	0.17	0.19
2-Methyl-1-butene	ND	ND	ND	0.02	ND	ND
Pentane	0.33	0.53	0.93	0.56	0.57	0.56
Isoprene	1.66	1.03	0.90	1.46	0.84	0.71
trans-2-Pentene	ND	ND	0.05	0.03	0.03	0.02
cis-2-Pentene	ND	ND	0.03	ND	ND	ND
2-Methyl-2-butene	0.05	ND	0.07	0.03	0.04	ND
2,2-Dimethylbutane	ND	ND	0.08	0.04	0.04	0.04
3-Methyl-1-pentene	0.08	0.14	0.05	0.03	0.11	0.06
Cyclopentane	ND	ND	0.05	0.03	0.03	ND
2,3-Dimethylbutane	ND	ND	ND	0.04	0.04	0.03
2-Methylpentane	0.36	0.13	0.59	0.61	0.44	0.37
3-Methylpentane	0.09	0.15	0.25	0.14	0.14	0.14
1-Hexene	0.06	0.09	0.27	0.10	0.11	0.12
Hexane	0.24	0.38	0.60	0.26	0.49	0.35
trans-2-Hexene	ND	ND	0.04	ND	0.02	ND
2-Methyl-2-pentene	ND	ND	0.02	0.01	0.02	ND
trans-3-Methyl-2-pentene	ND	ND	ND	ND	ND	ND
cis-2-Hexene	ND	ND	0.03	ND	ND	ND
cis-3-Methyl-2-pentene	ND	ND	0.02	ND	ND	0.03
Methylcyclopentane	0.07	0.09	ND	0.05	0.04	ND
2,4-Dimethylpentane	ND	ND	0.05	ND	ND	0.03
Benzene	0.24	0.44	0.70	0.53	0.49	0.53
Cyclohexane	0.04	0.07	0.07	0.06	0.11	0.10
2-Methylhexane	0.12	0.18	0.28	0.16	0.90	0.11
2,3-Dimethylpentane	ND	0.06	0.10	0.05	0.32	0.05
3-Methylhexane	0.48	0.79	0.98	0.16	2.58	0.41
trans-1,3-Dimethylcyclohexane	ND	ND	0.10	0.07	0.34	0.07
cis-1,3-Dimethylcyclohexane	0.08	0.06	0.48	0.20	0.74	0.12
2,2,4-Trimethylpentane	0.09	0.10	0.39	0.14	0.64	0.17
Heptane	0.68	0.11	2.09	1.04	11.40	0.68
t-2-Heptene	0.04	0.05	0.11	0.02	0.04	0.03
c-2-Heptene	ND	ND	0.22	0.07	0.09	ND
Methylcyclohexane	0.72	ND	0.09	0.41	6.16	0.25
2,5-Dimethylhexane	0.10	ND	0.03	0.02	0.14	0.08
2,4-Dimethylhexane	ND	ND	0.27	0.15	1.64	ND
2,3,4-Trimethylpentane	ND	ND	0.04	0.03	0.04	0.02
Toluene	1.01	0.74	2.78	1.00	2.97	0.72
2-Methylheptane	ND	0.04	0.06	ND	0.08	0.32
4-Methylheptane	ND	ND	0.06	0.36	0.26	ND

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	22-Jan-88	28-Jan-88	9-Feb-88	15-Feb-88	21-Feb-88	27-Feb-88
3-Methylheptane	ND	0.08	0.11	0.05	0.28	0.03
2,2,5-Trimethylhexane	0.27	0.29	0.25	0.21	0.23	0.14
Octane	0.06	0.05	0.21	0.11	0.20	0.05
Ethylbenzene	0.18	0.15	0.26	0.15	0.13	0.09
2,3-dimethylheptane	ND	ND	0.02	0.02	0.05	0.01
m,p-Xylene	0.62	0.55	0.87	0.68	0.84	0.36
4-Methyloctane	ND	0.03	0.04	0.07	0.03	ND
3-Methyloctane	0.16	ND	0.05	0.03	0.17	ND
Styrene	ND	ND	0.10	ND	ND	0.09
o-Xylene	0.23	0.19	0.62	0.44	0.42	0.19
Nonane	0.04	0.04	0.05	0.08	0.08	0.03
iso-Propylbenzene	ND	ND	0.05	0.06	0.09	0.09
n-Propylbenzene	0.03	ND	0.07	0.06	0.06	0.04
4-Ethyltoluene	0.09	0.10	0.12	0.15	0.13	0.10
3-Ethyltoluene	0.14	0.04	0.09	0.16	0.10	0.05
1,3,5-Trimethylbenzene	ND	0.03	0.02	0.09	0.03	0.03
2-Ethyltoluene	0.04	ND	0.04	0.10	0.13	0.08
1,2,4-Trimethylbenzene	0.42	0.49	0.15	2.12	0.64	1.40
Decane	0.05	ND	0.03	0.10	0.03	0.04
1,2,3-Trimethylbenzene	0.14	ND	0.03	0.08	0.04	0.03
p-Cymene	0.11	0.06	0.11	ND	ND	ND
Indane	0.04	ND	0.03	0.05	0.04	0.03
1,3-Diethylbenzene	0.06	0.05	0.07	0.10	0.09	0.07
1,4-Diethylbenzene	ND	ND	ND	0.10	0.03	0.06
1,2-Diethylbenzene	0.09	0.04	0.05	0.17	0.16	0.20
Undecane	0.03	ND	0.05	0.09	0.05	0.07
Dodecane	0.12	0.12	0.16	0.28	0.23	0.30
Trichlorofluoromethane	0.44	0.37	1.40	0.39	0.38	0.31
Dichloromethane	0.81	0.45	1.02	0.64	0.48	0.30
Chloroform	0.12	0.09	0.09	0.09	0.07	0.06
1,1,1-Trichloroethane	0.19	0.25	0.38	0.17	0.21	0.21
Carbontetrachloride	0.11	0.12	0.41	0.22	0.63	0.51
Trichloroethylene	0.07	0.05	0.11	0.10	0.09	0.04
Tetrachloroethylene	0.05	0.06	0.12	0.07	0.09	0.08
1,4-Dichlorobenzene	0.47	0.07	0.15	0.15	0.66	0.76

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	10-Mar-88	28-Mar-88	9-Apr-88	15-Apr-88	21-Apr-88	27-Apr-88
C2						
Propylene	0.38	0.16	0.53	0.21	0.17	0.17
Propane	1.25	0.78	2.01	0.99	0.86	0.83
1-Propyne	0.04	ND	0.05	ND	ND	ND
Isobutane	0.29	ND	0.71	0.20	0.2	ND
1-Butene/Isobutene	1.09	0.38	0.87	0.63	ND	ND
1,3-Butadiene	0.05	ND	0.08	0.02	0.02	ND
Butane	1.38	1.40	1.77	1.00	0.93	1.42
trans-2-Butene	0.03	ND	ND	ND	ND	ND
2,2-Dimethylpropane	ND	ND	ND	ND	ND	ND
1-Butyne	ND	ND	ND	ND	ND	ND
cis-Butene	0.03	ND	0.03	ND	ND	ND
2-Methyl-1-butene	ND	ND	ND	ND	ND	ND
2-Methylbutae	0.55	1.82	0.67	0.21	0.36	0.30
1-Pentene	0.07	0.04	0.06	0.05	0.03	0.03
2-Methyl-1-butene	ND	ND	0.02	0.01	0.01	ND
Pentane	0.56	0.34	1.24	0.27	0.32	0.38
Isoprene	0.60	0.59	0.97	0.28	0.35	0.71
trans-2-Pentene	0.03	ND	0.04	0.01	0.01	0.02
cis-2-Pentene	ND	ND	ND	ND	ND	ND
2-Methyl-2-butene	ND	ND	ND	ND	ND	ND
2,2-Dimethylbutane	0.04	0.02	0.05	0.02	0.02	0.02
3-Methyl-1-pentene	0.13	0.06	0.11	0.02	0.09	ND
Cyclopentane	0.03	ND	0.05	0.09	0.08	0.04
2,3-Dimethylbutane	ND	ND	ND	0.15	0.20	0.27
2-Methylpentane	0.27	0.14	0.47	0.52	0.59	0.35
3-Methylpentane	0.13	0.07	0.16	0.06	0.07	0.08
1-Hexene	0.10	0.05	0.08	0.07	0.05	0.03
Hexane	0.63	0.46	0.30	0.08	0.16	0.23
trans-2-Hexene	0.02	ND	ND	ND	ND	ND
2-Methyl-2-pentene	ND	ND	ND	0.01	ND	ND
trans-3-Methyl-2-pentene	ND	ND	ND	0.18	ND	0.14
cis-2-Hexene	ND	ND	ND	ND	ND	ND
cis-3-Methyl-2-pentene	ND	ND	ND	ND	ND	ND
Methylcyclopentane	0.13	0.09	0.08	ND	0.01	ND
2,4-Dimethylpentane	0.01	ND	0.01	ND	ND	ND
Benzene	0.42	0.27	0.44	0.23	0.21	0.18
Cyclohexane	0.09	0.03	0.06	0.05	0.02	0.02
2-Methylhexane	0.09	0.09	0.44	0.13	0.09	0.14
2,3-Dimethylpentane	0.03	0.06	0.04	0.05	ND	0.02
3-Methylhexane	0.56	0.27	0.61	0.47	0.58	0.43
trans-1,3-Dimethylcyclohexane	0.01	ND	ND	ND	0.01	ND
cis-1,3-Dimethylcyclohexane	0.12	ND	0.06	ND	0.04	ND
2,2,4-Trimethylpentane	0.09	0.08	0.06	0.03	0.06	0.07
Heptane	0.14	0.05	0.13	0.02	0.39	0.17
t-2-Heptene	0.02	ND	0.02	0.03	0.01	0.02
c-2-Heptene	0.08	0.03	0.10	0.06	0.02	0.04
Methylcyclohexane	0.04	0.02	0.01	0.03	0.13	0.02
2,5-Dimethylhexane	ND	ND	0.03	ND	ND	ND
2,4-Dimethylhexane	0.02	ND	ND	0.01	0.05	ND
2,3,4-Trimethylpentane	ND	ND	ND	0.08	0.11	0.04
Toluene	0.72	0.29	0.43	0.22	0.49	0.38
2-Methylheptane	0.04	0.32	0.04	ND	0.01	0.02
4-Methylheptane	0.04	0.04	0.05	0.03	0.02	0.04

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	10-Mar-88	28-Mar-88	9-Apr-88	15-Apr-88	21-Apr-88	27-Apr-88
3-Methylheptane	0.02	0.02	0.01	0.04	0.02	0.01
2,2,5-Trimethylhexane	0.30	0.18	0.24	0.23	0.27	0.46
Octane	0.06	0.02	0.04	0.02	0.03	0.04
Ethylbenzene	0.10	0.07	0.10	0.03	ND	ND
2,3-dimethylheptane	0.01	ND	ND	0.01	0.04	0.05
m,p-Xylene	0.40	0.29	0.34	0.15	0.24	0.22
4-Methyloctane	ND	0.01	ND	0.01	ND	ND
3-Methyloctane	ND	ND	ND	ND	ND	ND
Styrene	0.13	0.10	0.07	ND	ND	0.01
o-Xylene	0.10	0.14	0.17	0.06	0.10	0.10
Nonane	0.03	0.02	0.02	0.04	0.03	0.02
iso-Propylbenzene	ND	ND	ND	ND	ND	ND
n-Propylbenzene	0.06	0.02	0.04	0.03	0.03	0.03
4-Ethyltoluene	0.12	0.07	0.08	0.06	0.07	0.11
3-Ethyltoluene	0.06	0.15	0.07	0.05	0.04	0.55
1,3,5-Trimethylbenzene	0.03	0.02	0.02	0.02	0.02	0.02
2-Ethyltoluene	0.02	0.02	0.02	0.02	0.03	0.02
1,2,4-Trimethylbenzene	0.61	1.38	0.36	0.54	0.59	0.91
Decane	0.04	0.06	0.04	0.07	0.06	0.06
1,2,3-Trimethylbenzene	0.02	0.10	ND	0.19	0.14	0.14
p-Cymene	0.20	0.24	0.13	0.02	0.13	0.02
Indane	0.04	0.02	0.02	0.05	ND	0.02
1,3-Diethylbenzene	0.09	0.06	0.06	0.11	0.07	0.11
1,4-Diethylbenzene	0.04	0.04	0.02	0.11	0.05	0.09
1,2-Diethylbenzene	0.02	0.04	0.03	0.15	0.07	0.04
Undecane	0.04	0.06	0.04	0.10	0.07	0.06
Dodecane	0.18	0.25	0.18	0.43	0.36	0.23
Trichlorofluoromethane	0.72	0.49	0.35	0.30	0.31	0.46
Dichloromethane	0.38	0.41	ND	ND	ND	ND
Chloroform	0.15	0.03	0.07	0.07	0.04	0.09
1,1,1-Trichloroethane	0.21	0.13	0.19	0.18	0.14	0.19
Carbontetrachloride	0.33	0.14	0.29	0.16	0.10	0.21
Trichloroethylene	0.09	0.03	0.05	0.07	0.04	0.05
Tetrachloroethylene	0.06	0.04	0.05	0.04	0.04	0.05
1,4-Dichlorobenzene	0.36	0.46	0.11	0.48	0.19	0.09

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	3-May-88	9-May-88	15-May-88	21-May-88	27-May-88	14-Jun-88
C2						
Propylene	0.16	0.22	0.23	0.33	0.28	3.51
Propane	0.64	0.81	1.22	2.21	1.26	8.23
1-Propyne	ND	0.04	0.02	ND	ND	0.08
Isobutane	ND	0.29	0.38	0.76	0.37	0.59
1-Butene/Isobutene	ND	0.76	0.89	0.54	0.65	11.47
1,3-Butadiene	ND	0.02	0.03	ND	0.02	0.47
Butane	0.90	1.14	1.54	1.35	1.93	4.44
trans-2-Butene	ND	0.03	0.09	0.10	0.01	0.62
2,2-Dimethylpropane	ND	ND	ND	ND	ND	ND
1-Butyne	ND	ND	ND	ND	ND	0.11
cis-Butene	ND	0.02	0.03	0.03	0.01	0.28
2-Methyl-1-butene	ND	0.01	0.01	0.01	ND	0.07
2-Methylbutae	0.26	0.51	1.20	1.35	0.69	1.81
1-Pentene	0.03	0.07	0.06	0.02	0.04	2.33
2-Methyl-1-butene	0.01	ND	0.02	0.03	ND	ND
Pentane	0.32	0.57	0.93	0.89	0.48	2.40
Isoprene	0.63	1.74	1.28	1.42	0.75	0.28
trans-2-Pentene	0.02	0.04	0.05	0.05	0.02	0.74
cis-2-Pentene	ND	ND	0.01	ND	ND	0.22
2-Methyl-2-butene	ND	0.04	0.04	0.02	ND	0.22
2,2-Dimethylbutane	0.02	0.04	0.05	0.06	0.04	0.20
3-Methyl-1-pentene	0.10	0.14	0.19	0.13	0.11	0.22
Cyclopentane	0.02	0.03	0.05	0.06	0.02	0.09
2,3-Dimethylbutane	ND	0.04	0.07	0.08	0.05	0.12
2-Methylpentane	0.45	1.59	0.62	1.73	0.60	3.29
3-Methylpentane	0.07	0.22	0.22	0.29	0.13	0.61
1-Hexene	0.07	0.15	0.06	0.12	0.05	0.26
Hexane	0.12	0.38	0.54	0.56	0.21	1.02
trans-2-Hexene	ND	ND	0.02	0.01	ND	0.40
2-Methyl-2-pentene	ND	ND	0.01	0.02	ND	0.04
trans-3-Methyl-2-pentene	0.13	0.12	0.22	0.23	0.04	0.30
cis-2-Hexene	ND	ND	ND	ND	ND	0.12
cis-3-Methyl-2-pentene	ND	ND	ND	ND	ND	0.64
Methylcyclopentane	ND	ND	ND	ND	ND	0.19
2,4-Dimethylpentane	ND	ND	ND	ND	ND	0.09
Benzene	0.21	0.33	0.33	0.68	0.33	1.25
Cyclohexane	0.02	0.11	0.11	0.19	0.12	0.16
2-Methylhexane	0.31	0.42	0.38	0.07	0.10	0.41
2,3-Dimethylpentane	0.10	0.16	0.19	0.08	0.02	0.15
3-Methylhexane	0.97	0.93	1.15	0.63	0.51	5.74
trans-1,3-Dimethylcyclohexane	ND	0.05	0.12	0.16	0.11	0.07
cis-1,3-Dimethylcyclohexane	ND	0.31	0.27	ND	0.03	1.46
2,2,4-Trimethylpentane	2.93	0.17	0.04	0.32	0.15	0.49
Heptane	0.02	0.07	0.01	0.40	0.06	2.81
t-2-Heptene	0.08	0.06	0.03	0.03	0.11	0.67
c-2-Heptene	ND	0.10	0.07	0.07	0.06	ND
Methylcyclohexane	1.62	1.22	0.02	0.15	0.02	0.07
2,5-Dimethylhexane	0.48	0.03	0.04	0.08	0.00	0.26
2,4-Dimethylhexane	0.01	0.35	ND	0.03	ND	0.06
2,3,4-Trimethylpentane	0.05	0.27	0.02	0.04	0.01	0.05
Toluene	1.45	1.39	0.56	1.07	0.53	3.49
2-Methylheptane	0.02	0.03	0.05	0.06	0.42	0.34
4-Methylheptane	0.05	0.07	ND	0.03	0.03	ND

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	3-May-88	9-May-88	15-May-88	21-May-88	27-May-88	14-Jun-88
3-Methylheptane	0.09	0.06	0.05	0.07	0.02	0.38
2,2,5-Trimethylhexane	0.18	0.34	0.55	0.39	0.23	8.18
Octane	0.08	0.07	0.02	0.05	0.05	0.84
Ethylbenzene	ND	0.12	0.19	ND	0.07	0.37
2,3-dimethylheptane	0.04	0.07	ND	0.52	ND	0.22
m,p-Xylene	0.39	0.59	0.57	2.25	0.25	1.27
4-Methyloctane	ND	0.12	0.34	1.28	0.03	0.19
3-Methyloctane	ND	0.22	ND	0.75	0.06	0.08
Styrene	ND	ND	ND	ND	ND	ND
o-Xylene	0.16	0.24	0.14	0.65	0.12	1.40
Nonane	0.03	0.05	0.04	0.07	0.04	0.68
iso-Propylbenzene	0.02	0.06	0.01	0.03	0.03	0.29
n-Propylbenzene	0.03	0.05	0.05	0.04	0.01	0.16
4-Ethyltoluene	0.07	0.11	0.12	0.11	0.06	0.63
3-Ethyltoluene	0.05	0.07	0.11	0.08	0.04	ND
1,3,5-Trimethylbenzene	0.03	0.06	0.05	0.06	0.02	0.26
2-Ethyltoluene	0.08	0.07	0.04	0.04	0.01	0.34
1,2,4-Trimethylbenzene	0.87	0.92	1.68	1.03	0.74	1.06
Decane	0.05	0.09	0.09	0.10	0.06	0.14
1,2,3-Trimethylbenzene	0.02	ND	0.05	0.08	0.02	0.20
p-Cymene	0.24	0.25	0.35	ND	0.39	0.46
Indane	0.02	0.09	0.15	ND	0.04	0.72
1,3-Diethylbenzene	0.03	0.13	0.14	0.08	0.05	0.67
1,4-Diethylbenzene	0.02	0.11	0.10	0.13	0.05	0.52
1,2-Diethylbenzene	0.11	0.10	0.14	0.18	0.08	0.39
Undecane	0.08	0.04	0.05	0.04	0.12	0.70
Dodecane	0.29	0.06	0.62	0.37	0.42	0.07
Trichlorofluoromethane	0.41	0.49	0.54	0.42	0.43	1.01
Dichloromethane	ND	0.23	0.30	0.40	0.31	0.92
Chloroform	0.06	0.06	0.17	0.94	0.11	0.21
1,1,1-Trichloroethane	0.16	0.27	0.22	0.26	0.29	0.41
Carbontetrachloride	0.39	0.30	0.31	0.97	0.30	0.31
Trichloroethylene	0.10	0.21	0.12	0.53	0.14	0.36
Tetrachloroethylene	0.06	0.06	0.07	0.28	0.07	0.19
1,4-Dichlorobenzene	0.62	0.24	0.14	0.47	0.09	0.57

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	26-Jun-88	26-Jul-88	1-Aug-88	7-Aug-88	13-Aug-88	19-Aug-88
C2						
Propylene	0.36	0.29	0.29	0.23	0.36	0.45
Propane	0.66	0.70	0.89	0.77	0.89	0.67
1-Propyne	ND	0.10	0.10	0.08	0.33	ND
Isobutane	ND	0.40	0.45	0.32	0.45	0.47
1-Butene/Isobutene	1.48	0.83	0.83	0.76	1.03	0.96
1,3-Butadiene	0.02	0.03	0.02	0.04	0.06	0.04
Butane	0.66	1.22	1.69	1.15	2.58	0.89
trans-2-Butene	0.02	0.02	0.03	0.04	0.08	0.04
2,2-Dimethylpropane	ND	ND	ND	0.01	0.02	ND
1-Butyne	ND	ND	ND	ND	0.01	ND
cis-Butene	0.02	0.03	0.05	0.03	0.05	0.04
2-Methyl-1-butene	ND	0.01	0.01	0.01	0.02	0.01
2-Methylbutae	0.41	0.69	0.95	0.61	1.50	0.63
1-Pentene	0.06	0.16	0.18	0.08	0.11	0.07
2-Methyl-1-butene	ND	ND	ND	ND	ND	ND
Pentane	0.44	0.85	2.37	0.75	1.24	0.69
Isoprene	0.05	0.11	0.24	0.18	0.36	0.06
trans-2-Pentene	ND	0.03	0.04	0.04	0.08	0.14
cis-2-Pentene	ND	0.02	0.01	0.01	0.01	0.01
2-Methyl-2-butene	0.02	0.05	0.03	0.06	0.10	0.08
2,2-Dimethylbutane	0.02	0.06	0.07	0.08	0.17	0.08
3-Methyl-1-pentene	0.12	0.18	0.03	ND	ND	ND
Cyclopentane	0.02	0.03	0.06	0.04	0.07	0.04
2,3-Dimethylbutane	0.02	0.04	0.07	0.05	0.10	0.07
2-Methylpentane	0.35	1.01	1.08	0.53	1.94	1.18
3-Methylpentane	0.13	0.07	0.09	0.49	0.97	2.79
1-Hexene	0.06	0.06	0.07	0.06	0.09	0.07
Hexane	0.75	9.43	5.67	7.77	15.59	44.01
trans-2-Hexene	0.02	ND	ND	ND	ND	ND
2-Methyl-2-pentene	0.01	0.02	0.04	0.01	0.05	ND
trans-3-Methyl-2-pentene	ND	ND	ND	ND	0.03	ND
cis-2-Hexene	ND	ND	ND	ND	ND	ND
cis-3-Methyl-2-pentene	ND	ND	ND	0.01	0.01	0.01
Methylcyclopentane	0.11	1.65	1.08	1.88	3.45	12.94
2,4-Dimethylpentane	0.01	0.03	0.03	0.04	0.11	ND
Benzene	0.20	0.24	0.32	0.23	0.55	0.37
Cyclohexane	0.17	0.09	0.10	0.07	0.09	0.05
2-Methylhexane	0.04	0.06	1.08	0.09	0.22	0.07
2,3-Dimethylpentane	0.01	0.04	0.35	0.04	0.09	0.03
3-Methylhexane	0.70	1.45	4.31	1.31	2.75	2.11
trans-1,3-Dimethylcyclohexane	ND	0.01	0.43	ND	0.03	0.01
cis-1,3-Dimethylcyclohexane	ND	0.07	0.81	ND	ND	0.10
2,2,4-Trimethylpentane	0.16	0.24	0.90	0.22	0.45	0.17
Heptane	0.07	0.17	15.95	0.13	1.46	0.18
t-2-Heptene	0.04	0.07	0.12	0.06	0.91	0.32
c-2-Heptene	0.05	0.12	0.13	0.07	0.11	0.15
Methylcyclohexane	0.02	0.06	7.99	0.04	0.46	0.04
2,5-Dimethylhexane	0.01	0.02	0.18	0.02	0.04	0.03
2,4-Dimethylhexane	0.02	0.02	2.06	0.09	0.21	0.03
2,3,4-Trimethylpentane	0.00	0.02	0.02	0.04	0.05	0.01
Toluene	0.33	0.78	4.77	0.49	2.06	0.87
2-Methylheptane	0.03	0.03	0.07	0.06	0.10	0.05
4-Methylheptane	ND	ND	0.33	ND	0.04	ND

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	26-Jun-88	26-Jul-88	1-Aug-88	7-Aug-88	13-Aug-88	19-Aug-88
3-Methylheptane	0.01	0.04	0.45	0.03	0.10	0.04
2,2,5-Trimethylhexane	0.38	2.04	1.99	1.95	4.39	1.14
Octane	0.04	0.07	0.31	0.08	0.10	0.03
Ethylbenzene	0.06	0.14	0.11	0.06	0.33	0.23
2,3-dimethylheptane	0.04	0.06	0.16	0.05	0.10	0.09
m,p-Xylene	0.21	0.49	1.27	0.23	1.11	0.72
4-Methyloctane	0.01	0.00	0.06	0.01	0.03	0.02
3-Methyloctane	ND	ND	0.18	0.00	0.02	0.00
Styrene	ND	ND	ND	ND	ND	ND
o-Xylene	0.07	0.20	0.18	0.10	0.30	0.20
Nonane	0.07	0.24		0.21	0.22	0.19
iso-Propylbenzene	0.02	0.04	0.15	0.02	0.01	0.05
n-Propylbenzene	0.02	0.08	0.09	0.08	0.13	0.17
4-Ethyltoluene	0.10	0.23	0.30	0.15	0.45	0.20
3-Ethyltoluene	0.04	1.85	2.09	1.13	1.42	0.58
1,3,5-Trimethylbenzene	0.02	0.12	0.13	0.02	0.14	0.09
2-Ethyltoluene	0.13	0.08	0.85	0.18	0.37	0.12
1,2,4-Trimethylbenzene	0.18	0.70	0.81	0.77	0.99	0.72
Decane	0.09	0.20	0.22	0.11	0.23	0.14
1,2,3-Trimethylbenzene	0.06	3.22	3.87	3.39	3.87	0.87
p-Cymene	0.19	ND	ND	ND	ND	ND
Indane	0.05	0.14	0.16	0.09	0.20	0.08
1,3-Diethylbenzene	0.13	0.32	0.33	0.09	0.31	0.15
1,4-Diethylbenzene	0.02	0.19	0.28	0.06	0.21	0.11
1,2-Diethylbenzene	0.06	0.27	1.42	0.12	0.47	0.18
Undecane	0.12	0.44	0.59	0.30	0.56	0.39
Dodecane	0.22	1.70	1.97	1.04	1.79	1.45
Trichlorofluoromethane	0.42	0.55	0.45	0.46	0.54	0.48
Dichloromethane	0.48	0.38	0.38	0.37	0.49	0.36
Chloroform	0.03	0.03	0.03	0.10	0.09	0.08
1,1,1-Trichloroethane	0.21	0.42	0.29	0.31	0.39	0.39
Carbontetrachloride	0.15	0.32	0.32	0.32	0.26	0.28
Trichloroethylene	0.05	0.08	0.32	0.10	0.13	0.31
Tetrachloroethylene	0.03	0.07	0.08	0.05	0.13	0.06
1,4-Dichlorobenzene	0.38	0.61	0.08	0.95	0.57	0.24

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	25-Aug-88	31-Aug-88	6-Sep-88	12-Sep-88	18-Sep-88	24-Sep-88
C2						
Propylene	0.31	0.89	0.44	0.30	0.52	0.51
Propane	0.64	1.45	0.64	1.10	1.49	1.54
1-Propyne	ND	0.11	0.07	ND	0.10	0.10
Isobutane	0.18	0.59	0.18	0.54	0.74	0.61
1-Butene/Isobutene	0.85	2.33	1.55	1.56	2.01	1.57
1,3-Butadiene	0.03	0.12	0.05	0.03	0.04	0.06
Butane	1.31	2.46	0.78	2.23	1.91	1.52
trans-2-Butene	0.02	0.06	0.03	0.05	0.04	0.06
2,2-Dimethylpropane	ND	ND	ND	ND	ND	0.02
1-Butyne	ND	ND	ND	ND	ND	ND
cis-Butene	0.03	0.06	0.03	0.10	0.03	0.04
2-Methyl-1-butene	0.01	0.03	0.02	0.02	0.02	0.02
2-Methylbutae	0.68	1.54	0.39	1.33	1.24	0.85
1-Pentene	0.07	0.30	0.13	0.12	0.13	0.08
2-Methyl-1-butene	ND	ND	ND	ND	ND	ND
Pentane	0.59	1.38	0.62	1.36	1.60	1.35
Isoprene	0.05	0.09	0.06	0.08	0.08	0.06
trans-2-Pentene	0.05	0.15	0.05	0.08	0.05	0.05
cis-2-Pentene	0.01	0.02	0.01	0.02	0.01	0.01
2-Methyl-2-butene	0.10	0.18	0.09	0.10	0.09	0.07
2,2-Dimethylbutane	0.04	0.11	0.05	0.09	0.08	0.09
3-Methyl-1-pentene	ND	0.07	ND	0.04	0.31	ND
Cyclopentane	0.03	0.07	0.02	0.06	0.05	0.05
2,3-Dimethylbutane	0.05	0.10	0.02	0.08	0.07	0.05
2-Methylpentane	0.49	1.09	0.48	0.78	0.70	0.80
3-Methylpentane	0.22	0.56	0.18	0.35	0.34	0.60
1-Hexene	0.05	0.28	0.14	0.10	0.12	0.11
Hexane	1.49	1.91	1.00	4.63	2.00	1.15
trans-2-Hexene	0.05	0.09	0.05	0.08	0.07	0.08
2-Methyl-2-pentene	0.03	0.04	0.03	0.03	0.05	0.03
trans-3-Methyl-2-pentene	ND	0.03	0.01	ND	ND	0.02
cis-2-Hexene	ND	0.03	ND	ND	ND	ND
cis-3-Methyl-2-pentene	0.02	0.02	ND	0.04	0.03	0.01
Methylcyclopentane	0.37	0.63	0.28	0.83	0.55	0.32
2,4-Dimethylpentane	0.03	0.08	0.02	0.05	0.05	0.03
Benzene	0.39	0.68	0.27	0.51	0.50	0.49
Cyclohexane	0.05	0.10	0.07	0.10	0.17	0.11
2-Methylhexane	0.14	0.33	0.21	0.22	0.13	0.12
2,3-Dimethylpentane	0.05	0.13	0.06	0.10	0.07	0.05
3-Methylhexane	0.96	4.07	1.75	1.35	1.21	1.45
trans-1,3-Dimethylcyclohexane	0.02	0.05	0.04	0.06	0.02	0.02
cis-1,3-Dimethylcyclohexane	ND	0.37	0.18	0.15	0.13	0.12
2,2,4-Trimethylpentane	0.31	0.44	0.24	0.30	0.31	0.36
Heptane	1.77	1.77	2.13	2.56	0.57	0.69
t-2-Heptene	0.08	0.18	0.06	0.12	0.08	0.09
c-2-Heptene	0.07	0.25	0.11	0.12	0.20	0.36
Methylcyclohexane	0.29	0.77	0.83	1.15	0.16	0.26
2,5-Dimethylhexane	0.02	0.08	0.05	0.05	0.10	0.03
2,4-Dimethylhexane	0.13	0.30	0.29	0.35	0.24	0.11
2,3,4-Trimethylpentane	0.02	0.09	0.03	0.02	0.05	0.02
Toluene	2.16	2.25	0.86	1.94	0.96	1.01
2-Methylheptane	0.05	0.19	0.06	0.08	0.11	0.10
4-Methylheptane	0.03	ND	0.05	0.08	ND	ND

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	25-Aug-88	31-Aug-88	6-Sep-88	12-Sep-88	18-Sep-88	24-Sep-88
3-Methylheptane	0.05	0.19	0.09	0.20	0.24	0.16
2,2,5-Trimethylhexane	0.63	2.38	0.89	0.67	0.78	1.11
Octane	0.07	0.15	0.10	0.14	0.06	0.05
Ethylbenzene	0.27	0.38	0.16	0.24	0.15	0.16
2,3-dimethylheptane	0.06	0.20	0.08	0.08	0.08	0.06
m,p-Xylene	0.89	1.37	0.85	1.13	0.55	0.54
4-Methyloctane	0.02	0.06	0.02	0.07	0.05	0.01
3-Methyloctane	0.01	0.03	0.03	0.04	0.01	0.01
Styrene	ND	ND	ND	ND	ND	ND
o-Xylene	0.18	0.44	0.24	0.37	0.17	0.18
Nonane	0.25	0.11	0.15	0.31	0.22	0.68
iso-Propylbenzene	0.02	0.06	0.06	0.25	0.01	0.01
n-Propylbenzene	0.06	0.38	0.22	0.25	0.48	1.59
4-Ethyltoluene	0.16	0.40	0.18	0.35	0.27	0.32
3-Ethyltoluene	0.49	0.79	0.53	1.05	0.73	0.84
1,3,5-Trimethylbenzene	0.02	0.15	0.06	0.15	0.11	0.11
2-Ethyltoluene	0.21	0.25	0.31	0.52	0.06	0.08
1,2,4-Trimethylbenzene	0.79	1.67	1.23	1.28	1.66	1.17
Decane	0.14	0.22	0.11	0.27	0.17	0.18
1,2,3-Trimethylbenzene	2.15	2.13	1.15	1.42	1.52	1.64
p-Cymene	ND	ND	0.30	1.02	1.00	ND
Indane	0.34	0.15	0.07	0.32	0.08	0.11
1,3-Diethylbenzene	0.35	0.46	0.17	0.65	0.26	0.26
1,4-Diethylbenzene	0.34	0.16	0.10	0.58	0.15	0.15
1,2-Diethylbenzene	0.62	0.68	0.42	1.46	0.39	0.29
Undecane	1.66	0.38	0.84	0.74	0.36	0.35
Dodecane	1.74	2.11	3.82	2.82	2.60	1.62
Trichlorofluoromethane	0.52	0.79	0.62	0.77	0.94	0.69
Dichloromethane	0.46	4.26	0.42	1.00	1.11	0.55
Chloroform	0.13	0.05	0.03	0.24	0.89	0.03
1,1,1-Trichloroethane	0.36	0.64	0.44	0.49	0.77	0.58
Carbontetrachloride	0.32	0.45	0.40	0.59	0.93	0.94
Trichloroethylene	0.19	0.45	0.06	0.28	0.30	0.15
Tetrachloroethylene	0.09	0.21	0.07	0.13	0.17	0.16
1,4-Dichlorobenzene	0.21	0.42	0.29	1.63	2.88	0.16

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	30-Sep-88	6-Oct-88	12-Oct-88
C2			
Propylene	0.27	0.26	0.18
Propane	1.24	0.82	0.50
1-Propyne	0.13	ND	ND
Isobutane	0.41	0.45	ND
1-Butene/Isobutene	1.32	0.73	ND
1,3-Butadiene	ND	0.05	0.05
Butane	1.68	0.70	0.51
trans-2-Butene	0.04	0.01	ND
2,2-Dimethylpropane	ND	ND	0.03
1-Butyne	ND	ND	ND
cis-Butene	ND	0.02	0.01
2-Methyl-1-butene	0.02	0.01	ND
2-Methylbutae	1.38	0.37	0.24
1-Pentene	0.10	0.04	0.07
2-Methyl-1-butene	0.03	ND	ND
Pentane	1.57	0.50	0.36
Isoprene	0.05	0.03	0.01
trans-2-Pentene	0.10	0.02	0.01
cis-2-Pentene	0.01	0.01	ND
2-Methyl-2-butene	0.07	0.04	0.01
2,2-Dimethylbutane	0.09	0.03	0.05
3-Methyl-1-pentene	0.04	0.11	0.06
Cyclopentane	0.06	0.02	0.06
2,3-Dimethylbutane	0.09	0.02	0.01
2-Methylpentane	0.78	0.26	0.17
3-Methylpentane	0.36	0.12	0.11
1-Hexene	0.16	0.04	0.09
Hexane	1.08	0.41	0.36
trans-2-Hexene	0.09	ND	ND
2-Methyl-2-pentene	0.04	0.02	0.01
trans-3-Methyl-2-pentene	0.02	ND	ND
cis-2-Hexene	0.01	ND	ND
cis-3-Methyl-2-pentene	0.02	0.01	0.01
Methylcyclopentane	0.30	0.10	0.13
2,4-Dimethylpentane	0.04	0.01	0.01
Benzene	0.70	0.20	0.21
Cyclohexane	0.15	0.06	0.16
2-Methylhexane	0.74	0.12	0.06
2,3-Dimethylpentane	0.30	0.03	0.02
3-Methylhexane	2.72	0.59	0.40
trans-1,3-Dimethylcyclohexane	0.26	0.03	0.01
cis-1,3-Dimethylcyclohexane	0.82	0.07	0.09
2,2,4-Trimethylpentane	0.76	0.18	0.09
Heptane	10.21	1.26	0.71
t-2-Heptene	0.13	0.04	0.02
c-2-Heptene	0.21	0.07	0.03
Methylcyclohexane	5.13	0.65	0.34
2,5-Dimethylhexane	0.15	0.02	0.01
2,4-Dimethylhexane	1.55	0.19	0.10
2,3,4-Trimethylpentane	0.08	0.01	ND
Toluene	3.55	0.83	0.44
2-Methylheptane	0.11	0.03	0.01
4-Methylheptane	0.30	0.04	0.01

Table E4 : VOC Concentrations (ppbv) by Sampling Day - Walpole Island

Compounds	30-Sep-88	6-Oct-88	12-Oct-88
3-Methylheptane	0.40	0.07	0.05
2,2,5-Trimethylhexane	0.68	0.26	0.20
Octane	0.22	0.05	0.03
Ethylbenzene	0.51	0.10	0.06
2,3-dimethylheptane	0.19	0.04	0.03
m,p-Xylene	2.19	0.47	0.28
4-Methyloctane	0.16	0.03	0.02
3-Methyloctane	0.23	0.02	0.01
Styrene	ND	ND	0.16
o-Xylene	1.47	0.11	
Nonane	0.34	0.12	0.21
iso-Propylbenzene	0.37	0.03	0.05
n-Propylbenzene	0.79	0.03	0.08
4-Ethyltoluene	0.56	0.12	0.22
3-Ethyltoluene	1.10	0.21	0.36
1,3,5-Trimethylbenzene	0.14	0.06	0.18
2-Ethyltoluene	1.00	0.13	0.34
1,2,4-Trimethylbenzene	0.90	0.64	0.63
Decane	0.30	0.09	0.05
1,2,3-Trimethylbenzene	2.32	0.34	0.39
p-Cymene	11.55	0.48	0.29
Indane	0.43	0.04	0.05
1,3-Diethylbenzene	1.33	0.19	0.71
1,4-Diethylbenzene	0.40	0.14	0.60
1,2-Diethylbenzene	2.46	0.54	0.96
Undecane	0.84	0.04	0.07
Dodecane	2.57	0.53	0.61
Trichlorofluoromethane	0.81	0.62	0.47
Dichloromethane	0.75	0.43	1.67
Chloroform	0.70	0.07	0.15
1,1,1-Trichloroethane	0.57	0.36	0.29
Carbontetrachloride	5.58	0.37	0.35
Trichloroethylene	0.93	0.13	0.19
Tetrachloroethylene	1.46	0.07	0.11
1,4-Dichlorobenzene	ND	1.41	2.03

APPENDIX F

Inhalable Particulate Matter, Sulphate, Nitrate and Multi - element

Sampling

Sampling was carried out using a Sierra Andersen dichotomous sampler as shown in *Figure F1*. The dichotomous sampler collects particulate matter in two size fractions: fine (<2.5 µm aerodynamic diameter) and coarse (2.5 to 10 µm). The sum of the two fractions is referred to as inhalable particulate matter or PM_{10}.

The filter media used in the samplers was Ghia Corporation teflon membrane (2 µm pore size). Filter samples were shipped by courier in specially designed shipment boxes. Upon receipt in Ottawa, the samples were conditioned (20°C, 50% R.H.) and mass determinations were made using a microgravimetric electronic balance. Filters were than analyzed by dispersive X-ray fluorescence spectroscopy using a Kevex 770/8000 multi-channel analyzer. Samples were subjected to three different measurement conditions allowing quantification of 40 different elements at detection levels as shown in *Table F1*. Finally, samples were extracted and sulphate/nitrate determinations were made using ion chromatography.

Summary statistics for all elements measured are contained in *Table F2* for Windsor and in *Table F3* for Walpole Island. Daily concentrations values for the fine and coarse particulate fraction are given in *Table F4* for Windsor and in *Table F5* for Walpole Island.

FIGURE F1- SIERRA-ANDERSEN DICHOTOMOUS SAMPLER

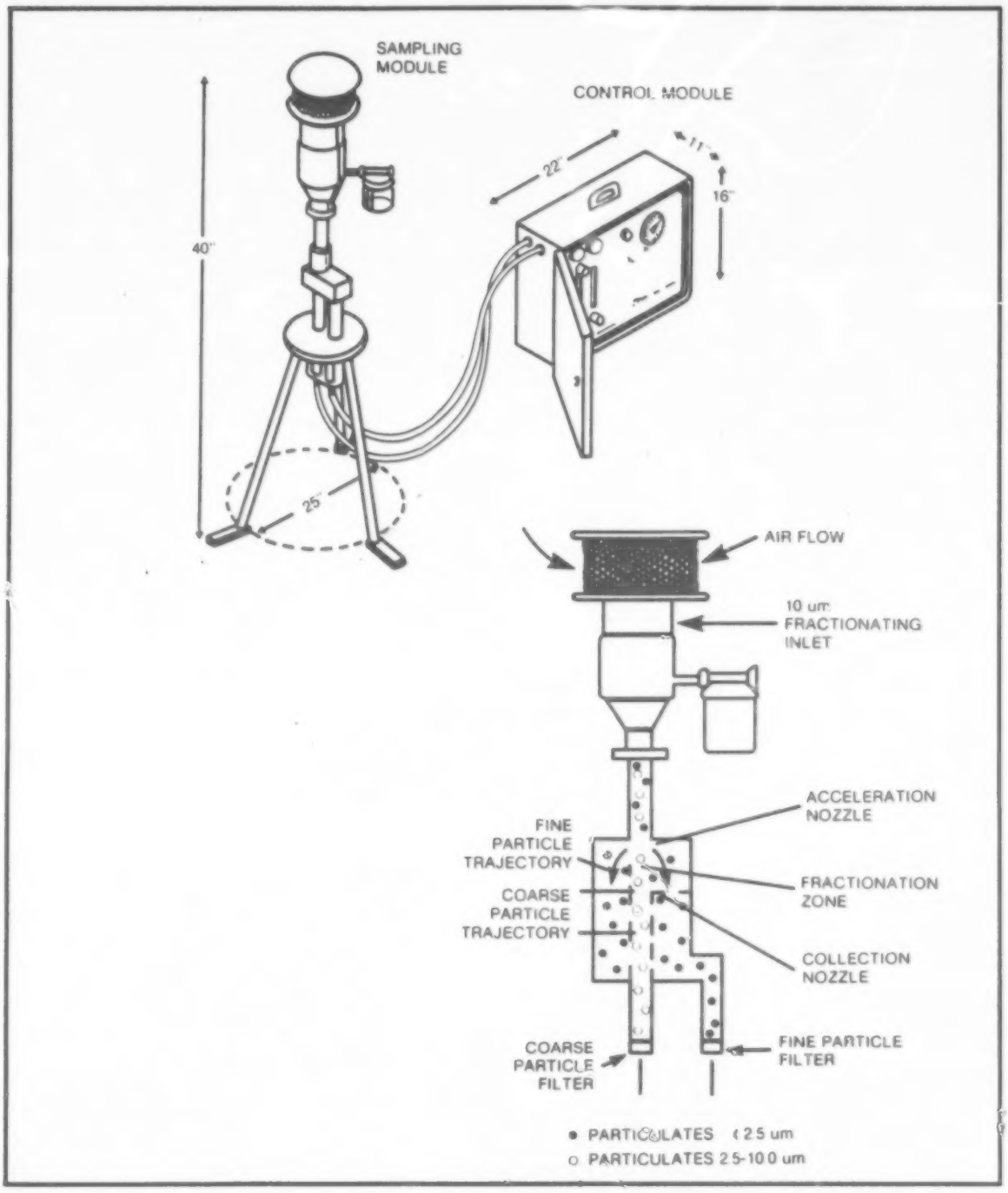


Table F1: Detection Levels for Measured Elements

Element	Symbol	Detection Level (ng/m^3)	Atomic Number
Aluminum	Al	3.9	13
Silicon	Si	1.8	14
Phosphorus	P	0.8	15
Sulphur	S	0.7	16
Chlorine	Cl	1.9	17
Potassium	K	1.8	19
Calcium	Ca	2.2	20
Scandium	Sc	2.5	21
Titanium	Ti	4.9	22
Vanadium	V	3.9	23
Chromium	Cr	3.2	24
Manganese	Mn	2.1	25
Iron	Fe	2.3	26
Cobalt	Co	1.4	27
Nickel	Ni	1.1	28
Copper	Cu	1.7	29
Zinc	Zn	1.1	30
Gallium	Ga	1.2	31
Germanium	Ge	0.8	32
Arsenic	As	0.5	33
Selenium	Se	0.5	34
Bromine	Br	0.4	35
Rubidium	Rb	0.3	37
Strontium	Sr	0.3	38
Yttrium	Y	0.3	39
Zirconium	Zr	0.4	40
Niobium	Nb	0.5	41
Molybdenum	Mo	0.6	42
Palladium	Pd	2.4	46
Silver	Ag	2.6	47
Cadmium	Cd	3.3	48
Indium	In	3.5	49
Tin	Sn	4.3	50
Antimony	Sb	4.7	51
Tellurium	Te	4.8	52
Iodine	I	5.0	53
Cesium	Cs	8.9	55
Barium	Ba	11.9	56
Lanthanum	La	15.5	57
Lead	Pb	0.8	82

Table F2 : Inhalable Particulate and Inorganic Compound Conc. ($\mu g/m^3$)
Windsor (July 87 - Sept. 88 : 67 Sampling Days)

DATE	No. < Detect.	MEAN	STD. DEV.	MEDIAN	MAX	MIN
MASS	0	36.8	21.9	31.0	102.0	10.0
SO4	0	6.68	6.42	4.37	29.55	0.69
NO3	0	1.24	1.42	0.85	9.38	0.04
Al	3	1.027	1.189	0.559	5.981	ND
Si	0	0.669	0.495	0.539	3.336	0.064
P	1	0.047	0.041	0.039	0.172	ND
S	0	2.627	2.015	2.060	9.710	0.291
Cl	4	0.330	0.428	0.195	1.775	ND
K	0	0.246	0.194	0.195	0.910	0.037
Ca	0	1.084	0.659	0.989	3.265	0.180
Sc	12	0.014	0.012	0.011	0.054	ND
Ti	1	0.039	0.028	0.034	0.174	ND
V	29	0.008	0.009	0.005	0.031	ND
Cr	22	0.007	0.007	0.005	0.029	ND
Mn	0	0.033	0.022	0.026	0.114	0.004
Fe	0	0.729	0.563	0.518	2.477	0.104
Co	16	0.004	0.004	0.003	0.015	ND
Ni	14	0.003	0.002	0.003	0.010	ND
Cu	16	0.013	0.011	0.010	0.042	ND
Zn	0	0.138	0.128	0.099	0.645	0.009
Ga	18	0.003	0.002	0.002	0.009	ND
Ge	53	-	-	ND	0.003	ND
As	27	0.001	0.001	0.001	0.004	ND
Se	11	0.003	0.002	0.003	0.007	ND
Br	0	0.018	0.014	0.014	0.078	0.003
Rb	25	0.001	0.001	0.001	0.006	ND
Sr	0	0.005	0.003	0.004	0.014	0.001
Y	58	-	-	ND	0.001	ND
Zr	16	0.001	0.001	0.001	0.005	ND
Nb	60	-	-	ND	0.001	ND
Mo	36	0.001	0.001	ND	0.004	ND
Pd	58	-	-	ND	0.103	ND
Ag	55	-	-	ND	0.006	ND
Cd	31	0.003	0.004	0.002	0.017	ND
In	49	-	-	ND	0.014	ND
Sn	26	0.005	0.007	0.004	0.033	ND
Sb	26	0.009	0.010	0.006	0.054	ND
Te	48	-	-	ND	0.030	ND
I	54	-	-	ND	0.015	ND
Cs	63	-	-	ND	0.008	ND
Ba	18	0.009	0.007	0.009	0.025	ND
La	55	-	-	ND	0.025	ND
Pb	0	0.068	0.029	0.063	0.145	0.017

Table F3 : Inhalable Particulate and Inorganic Compound Conc. ($\mu g/m^3$)
Walpole Island (Jan. 88 - Sept. 88 : 23 Sampling Days)

DATE	No. < Detect.	MEAN	STD. DEV.	MEDIAN	MAX	MIN
MASS	0	27	18	23	74	6
SO4	0	4.67	5.51	3.25	24.89	0.06
NO3	0	0.56	0.41	0.55	1.47	0.06
Al	2	0.259	0.281	0.146	1.054	ND
Si	1	0.658	0.743	0.380	2.817	ND
P	2	0.030	0.026	0.023	0.098	ND
S	1	1.991	2.091	1.329	9.175	ND
Cl	2	0.037	0.049	0.025	0.249	ND
K	1	0.157	0.139	0.119	0.645	ND
Ca	0	0.519	0.430	0.380	1.596	0.009
Sc	6	0.009	0.007	0.011	0.024	ND
Ti	5	0.024	0.028	0.016	0.101	ND
V	18	-	-	ND	0.013	ND
Cr	20	-	-	ND	0.006	ND
Mn	3	0.010	0.008	0.009	0.035	ND
Fe	0	0.232	0.217	0.174	0.915	0.003
Co	17	-	-	ND	0.005	ND
Ni	16	-	-	ND	0.010	ND
Cu	8	0.007	0.006	0.005	0.016	ND
Zn	1	0.028	0.022	0.016	0.090	ND
Ga	12	0.002	0.002	ND	0.006	ND
Ge	21	-	-	ND	0.001	ND
As	15	-	-	ND	0.002	ND
Se	5	0.002	0.001	0.002	0.004	ND
Br	1	0.003	0.002	0.003	0.007	ND
Rb	12	0.001	0.001	ND	0.002	ND
Sr	4	0.002	0.002	0.001	0.009	ND
Y	18	-	-	ND	0.001	ND
Zr	12	0.001	0.001	ND	0.005	ND
Nb	17	-	-	ND	0.001	ND
Mo	13	-	-	ND	0.003	ND
Pd	21	-	-	ND	0.002	ND
Ag	20	-	-	ND	0.002	ND
Cd	20	-	-	ND	0.003	ND
In	19	-	-	ND	0.010	ND
Sn	16	-	-	ND	0.012	ND
Sb	15	-	-	ND	0.027	ND
Te	14	-	-	ND	0.022	ND
I	22	-	-	ND	0.004	ND
Cs	22	-	-	ND	0.008	ND
Ba	19	-	-	ND	0.013	ND
La	19	-	-	ND	0.017	ND
Pb	0	0.017	0.011	0.014	0.052	0.005

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	20-Jul-87 C	20-Jul-87 F	26-Jul-87 C	26-Jul-87 F	1-Aug-87 C	1-Aug-87 F	7-Aug-87 C	7-Aug-87 F
MASS	53.0	47.0	16.0	18.0	20.0	27.0	30.0	33.0
SO4	0.8	14.6	0.1	6.3	ND	9.2	0.7	10.6
NO3	1.4	0.3	0.3	0.6	0.5	0.2	1.4	0.3
Al	5.040	0.941	1.650	0.429	3.220	0.382	1.920	0.460
Si	2.490	0.846	0.334	0.094	0.276	0.083	1.100	0.169
P	0.049	0.082	0.014	0.044	0.009	0.052	0.033	0.056
S	0.489	4.710	0.100	2.260	0.180	3.840	0.338	4.150
Cl	0.277	0.024	0.048	0.010	0.084	ND	0.227	ND
K	0.288	0.454	0.061	0.045	0.043	0.063	0.155	0.234
Ca	1.560	0.302	0.345	0.028	0.396	0.042	1.960	0.237
Sc	0.008	ND	ND	ND	ND	ND	ND	ND
Ti	0.110	0.064	0.024	0.010	0.020	0.009	0.056	0.018
V	0.020	0.011	0.016	0.015	0.007	ND	0.014	0.011
Cr	0.018	0.011	0.007	0.005	0.011	0.006	0.013	0.009
Mn	0.038	0.028	0.007	0.007	0.008	0.010	0.032	0.019
Fe	1.250	0.557	0.163	0.047	0.188	0.063	0.919	0.296
Co	0.008	0.005	0.002	ND	0.002	ND	0.006	0.002
Ni	0.003	0.003	0.003	0.002	0.001	0.001	0.002	0.002
Cu	0.018	0.005	0.010	0.007	0.021	0.019	0.015	0.009
Zn	0.044	0.111	0.008	0.011	0.011	0.028	0.045	0.110
Ga	0.002	ND	ND	ND	0.003	0.003	0.003	ND
Ge	ND	ND	ND	ND	ND	0.001	ND	ND
As	ND	0.001	ND	ND	ND	ND	ND	ND
Se	0.001	0.003	0.001	0.001	0.000	0.003	0.000	0.004
Br	0.005	0.014	0.002	0.004	0.004	0.009	0.008	0.036
Rb	0.002	0.004	0.001	ND	ND	ND	0.001	0.001
Sr	0.008	0.003	0.002	0.001	0.001	0.001	0.009	0.002
Y	0.001	ND	ND	ND	ND	ND	0.000	ND
Zr	0.003	0.001	0.000	ND	0.001	ND	0.002	ND
Nb	0.001	ND	ND	ND	ND	ND	ND	ND
Mo	0.001	ND	0.001	ND	ND	ND	0.001	ND
Pd	0.003	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	0.003	ND
In	ND	ND	ND	0.004	ND	0.004	ND	0.005
Sn	ND	0.006	ND	ND	ND	0.006	0.006	0.007
Sb	0.012	0.007	0.008	0.010	0.008	0.009	0.006	ND
Te	0.004	0.010	0.007	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	0.004	0.011	0.005	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	0.016	ND	ND	ND	ND	0.016	ND
La	ND	0.018	ND	0.018	ND	ND	ND	ND
Pb	0.015	0.062	0.006	0.035	0.011	0.051	0.021	0.077

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	13-Aug-87 C	13-Aug-87 F	19-Aug-87 C	19-Aug-87 F	25-Aug-87 C	25-Aug-87 F	31-Aug-87 C	31-Aug-87 F
MASS	30.0	62.0	29.0	25.0	9.0	22.0	21.0	18.0
SO4	0.5	27.3	0.6	5.7	0.6	5.5	0.4	5.1
NO3	1.2	0.3	1.1	0.8	0.3	0.4	0.4	0.3
Al	4.020	0.760	1.660	0.448	0.829	0.421	2.550	1.480
Si	0.853	0.146	0.738	0.144	ND	0.075	0.661	0.164
P	0.043	0.129	0.023	0.045	ND	0.039	0.032	0.074
S	0.531	9.140	0.234	2.060	ND	2.260	0.184	2.700
Cl	0.119	ND	0.226	0.057	ND	0.009	0.123	0.053
K	0.121	0.075	0.142	0.162	0.010	0.036	0.095	0.068
Ca	0.982	0.069	1.430	0.134	0.157	0.023	1.010	0.058
Sc	0.005	ND	0.008	ND	ND	ND	ND	ND
Ti	0.063	0.022	0.067	0.019	0.021	0.008	0.036	0.011
V	0.009	0.009	0.013	0.015	0.012	0.013	0.011	0.009
Cr	0.013	0.007	0.012	0.009	0.008	0.006	0.009	0.007
Mn	0.014	0.016	0.028	0.026	0.011	0.005	0.021	0.010
Fe	0.407	0.244	0.904	0.306	0.164	0.043	0.430	0.088
Co	0.003	0.002	0.006	0.003	0.002	ND	0.003	0.002
Ni	0.007	0.002	0.003	0.003	0.002	0.002	0.001	0.002
Cu	0.022	0.012	0.008	0.008	0.003	0.007	0.011	0.012
Zn	0.022	0.059	0.049	0.141	0.019	0.012	0.025	0.046
Ga	0.002	ND	ND	ND	ND	0.002	ND	0.003
Ge	ND	ND	ND	0.001	ND	ND	ND	ND
As	ND	ND	0.001	ND	ND	ND	ND	0.001
Se	0.001	0.006	0.000	0.006	ND	0.001	ND	0.003
Br	0.005	0.012	0.005	0.019	0.005	0.004	0.003	0.008
Rb	0.001	0.000	0.001	0.002	ND	ND	0.000	0.000
Sr	0.004	0.001	0.008	0.002	0.001	0.001	0.005	0.001
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	0.003	ND	ND	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	0.001	ND	ND	0.002	ND	0.001	ND	0.002
Pd	ND	ND	0.003	ND	0.103	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	ND	ND	ND	ND	0.004	ND	ND	ND
Sn	ND	0.007	ND	ND	0.033	ND	ND	0.005
Sb	0.012	0.010	0.008	0.007	ND	0.009	0.009	0.007
Te	ND	ND	0.006	0.008	ND	ND	0.008	ND
I	ND	ND	ND	0.007	ND	0.006	ND	0.008
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.013	ND	ND	ND	0.025	ND	ND	ND
La	0.016	ND	ND	0.020	ND	ND	ND	ND
Pb	0.016	0.069	0.019	0.068	0.017	0.035	0.014	0.039

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	6-Sep-87 C	6-Sep-87 F	12-Sep-87 C	12-Sep-87 F	18-Sep-87 C	18-Sep-87 F	24-Sep-87 C	24-Sep-87 F
MASS	8.0	24.0	11.0	29.0	19.0	18.0	17.0	14.0
SO4	0.4	10.8	0.6	11.4	1.1	6.1	0.4	2.3
NO3	0.4	0.1	0.7	0.3	1.0	0.2	0.4	0.4
Al	0.666	0.171	0.863	0.075	0.989	0.184	1.590	0.196
Si	0.450	0.098	0.436	0.091	1.120	0.164	1.250	0.125
P	0.027	0.110	0.059	0.110	0.067	0.088	0.071	0.048
S	0.384	6.410	0.702	5.770	0.684	3.690	0.326	1.470
Cl	0.058	ND	0.071	ND	0.129	0.006	0.245	0.038
K	0.053	0.032	0.084	0.063	0.204	0.123	0.192	0.101
Ca	0.475	0.023	0.968	0.055	2.000	0.112	1.800	0.096
Sc	ND	ND	0.009	ND	0.032	ND	0.018	ND
Ti	0.019	ND	0.014	0.009	0.043	0.009	0.056	0.013
V	0.005	0.007	0.007	ND	0.015	0.011	0.015	0.013
Cr	0.006	0.008	0.005	ND	0.007	0.004	0.009	0.007
Mn	0.008	0.007	0.007	0.009	0.024	0.018	0.024	0.023
Fe	0.296	0.060	0.236	0.063	0.488	0.131	0.830	0.208
Co	0.002	ND	0.001	ND	0.005	0.002	0.005	0.003
Ni	0.001	0.002	0.002	0.002	0.003	0.003	0.006	0.004
Cu	0.009	0.012	0.013	0.013	0.009	0.017	0.016	0.012
Zn	0.008	0.019	0.014	0.030	0.036	0.086	0.073	0.128
Ga	0.001	0.003	0.003	0.002	ND	0.003	0.003	0.002
Ge	ND	ND	ND	ND	0.001	0.001	0.001	0.001
As	ND	ND	ND	0.002	ND	ND	ND	ND
Se	0.001	0.004	0.000	0.003	0.001	0.002	0.001	0.002
Br	0.003	0.008	0.005	0.016	0.006	0.015	0.004	0.015
Rb	ND	ND	0.000	ND	0.001	0.001	0.001	0.000
Sr	0.002	0.001	0.003	0.001	0.006	0.001	0.007	0.001
Y	ND	ND	ND	ND	0.000	ND	0.000	0.000
Zr	0.001	ND	0.001	ND	0.002	0.001	0.002	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	0.001	ND	ND	0.001	0.001	ND
Pd	0.002	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	0.002	0.003
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	0.005	ND	ND	ND	ND	ND	0.003	ND
Sn	0.004	ND	ND	0.005	0.006	ND	ND	0.006
Sb	ND	0.013	0.006	0.005	0.005	0.006	0.008	0.008
Te	ND	ND	ND	ND	0.006	ND	0.005	ND
I	ND	ND	ND	ND	ND	ND	0.006	0.006
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.012	ND	ND	ND	0.015	ND
La	ND	ND	0.020	ND	ND	ND	ND	ND
Pb	0.013	0.047	0.019	0.063	0.019	0.066	0.018	0.066

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	6-Oct-87 C	6-Oct-87 F	12-Oct-87 C	12-Oct-87 F	18-Oct-87 C	18-Oct-87 F	17-Nov-87 C	17-Nov-87 F
MASS	14.0	14.0	10.0	18.0	10.0	17.0	11.0	13.0
SO4	0.7	2.7	0.2	2.5	0.4	5.1	0.5	2.6
NO3	1.0	0.3	0.3	1.1	0.4	0.6	0.1	0.6
Al	0.345	0.145	0.272	0.018	0.427	0.079	1.830	0.508
Si	0.881	0.112	0.737	0.037	0.351	0.083	0.371	0.175
P	0.028	0.035	0.019	0.022	0.025	0.062	0.012	0.034
S	0.351	1.680	0.150	1.300	0.234	2.740	0.390	1.670
Cl	0.176	0.098	0.079	0.032	0.264	0.064	0.452	0.891
K	0.128	0.089	0.084	0.050	0.073	0.188	0.099	0.749
Ca	1.320	0.052	0.956	0.025	0.723	0.053	1.120	0.228
Sc	0.019	ND	0.011	ND	0.008	ND	0.007	ND
Ti	0.041	0.009	0.037	0.012	0.021	0.008	0.025	0.010
V	0.007	0.006	0.007	0.009	0.007	0.007	0.008	0.006
Cr	0.009	0.004	0.005	0.005	0.007	0.005	0.010	0.005
Mn	0.025	0.024	0.019	0.016	0.017	0.017	0.031	0.026
Fe	0.827	0.289	0.420	0.093	0.724	0.208	1.460	0.410
Co	0.005	0.003	0.002	0.002	0.003	0.002	0.009	0.003
Ni	0.002	0.001	0.002	ND	ND	ND	0.003	0.002
Cu	0.006	0.010	0.008	0.003	0.007	0.008	0.025	0.017
Zn	0.048	0.114	0.017	0.036	0.051	0.137	0.044	0.110
Ga	0.001	0.002	0.001	ND	0.002	ND	0.001	0.002
Ge	ND	0.001	ND	ND	ND	ND	0.001	0.001
As	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.000	0.005	0.001	0.001	0.000	0.004	0.000	0.004
Br	0.006	0.073	0.007	0.033	0.003	0.017	0.003	0.022
Rb	0.001	ND	0.001	ND	0.000	0.002	0.001	0.005
Sr	0.004	0.001	0.004	0.001	0.003	0.001	0.003	0.001
Y	ND	0.000	ND	ND	ND	ND	0.001	ND
Zr	0.002	ND	0.001	ND	0.001	ND	0.002	ND
Nb	ND	ND	ND	ND	ND	ND	0.001	ND
Mo	ND	0.001	0.001	0.001	0.001	ND	0.001	0.001
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	ND	ND	0.003	ND	ND	ND	ND	ND
Sn	0.004	0.007	ND	ND	0.005	ND	ND	ND
Sb	0.010	0.008	0.008	0.006	0.008	0.007	ND	ND
Te	ND	ND	ND	0.009	ND	ND	0.004	ND
I	0.006	0.009	0.006	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.019	ND	ND	ND	0.009	ND
La	ND	ND	ND	0.018	ND	0.019	ND	ND
Pb	0.017	0.056	0.028	0.111	0.013	0.068	0.016	0.070

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	23-Nov-87 C	23-Nov-87 F	29-Nov-87 C	29-Nov-87 F	5-Dec-87 C	5-Dec-87 F	11-Dec-87 C	11-Dec-87 F
MASS	11.0	15.0	6.0	11.0	7.0	7.0	10.0	18.0
SO4	0.2	3.2	0.5	3.3	0.2	0.9	0.4	2.6
NO3	0.5	0.4	0.2	0.4	0.1	0.1	0.4	2.1
Al	1.770	0.382	0.388	0.150	0.464	0.072	0.470	0.127
Si	0.685	0.140	0.096	0.082	0.368	0.032	0.677	0.162
P	0.023	0.040	0.006	0.027	ND	0.008	0.012	0.042
S	0.186	2.150	0.389	1.060	0.111	0.530	0.236	1.670
Cl	0.191	0.067	0.112	0.167	0.427	0.012	0.263	0.699
K	0.080	0.149	0.023	0.101	0.037	0.043	0.151	0.361
Ca	0.766	0.060	0.223	0.043	0.628	0.025	0.913	0.076
Sc	ND	ND	ND	ND	0.004	0.004	ND	ND
Ti	0.025	0.006	0.010	ND	0.013	ND	0.027	0.009
V	0.006	ND	ND	ND	ND	ND	0.005	ND
Cr	0.003	ND	0.004	ND	0.004	ND	0.005	0.005
Mn	0.012	0.010	0.008	0.014	0.007	0.004	0.020	0.023
Fe	0.315	0.132	0.414	0.154	0.159	0.025	0.699	0.371
Co	0.003	ND	0.002	0.002	ND	ND	0.003	0.003
Ni	0.001	0.002	0.001	0.002	0.001	0.001	0.002	0.003
Cu	0.012	0.012	0.005	0.005	0.008	0.011	0.008	0.019
Zn	0.029	0.086	0.018	0.097	0.008	0.009	0.097	0.173
Ga	0.002	0.002	0.001	0.002	0.002	0.005	0.003	0.004
Ge	ND	0.001	ND	ND	ND	ND	ND	0.002
As	ND	ND	ND	ND	ND	ND	ND	0.001
Se	0.000	0.006	0.000	0.003	ND	ND	0.000	0.006
Br	0.003	0.024	0.002	0.009	0.002	0.006	0.003	0.035
Rb	0.001	ND	0.000	0.000	ND	ND	0.001	0.002
Sr	0.003	0.001	0.001	0.001	0.003	ND	0.004	0.001
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	ND	ND	0.000	ND	0.001	ND
Nb	0.001	ND	ND	ND	ND	ND	0.000	ND
Mo	0.001	0.001	ND	ND	0.001	0.001	0.001	0.002
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	0.002	ND	ND	ND	0.006
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	0.005	ND	ND	ND	ND
Cs	ND	ND	ND	0.007	ND	ND	ND	ND
Ba	0.015	ND	ND	ND	0.008	ND	0.009	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.016	0.044	0.012	0.027	0.013	0.032	0.016	0.071

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	17-Dec-87 C	17-Dec-87 F	23-Dec-87 C	23-Dec-87 F	29-Dec-87 C	29-Dec-87 F	4-Jan-88 C	4-Jan-88 F
MASS	5.0	6.0	18.0	38.0	8.0	8.0	23.0	13.0
SO4	0.1	1.5	1.0	6.7	0.4	1.7	0.6	2.5
NO3	0.1	0.1	1.1	8.3	0.1	0.2	0.3	0.8
Al	0.226	0.082	0.534	0.289	1.280	0.125	1.010	0.138
Si	0.226	0.051	0.816	0.169	0.745	0.085	0.870	0.116
P	0.006	0.015	0.040	0.076	0.012	0.006	0.007	0.027
S	0.056	0.868	0.608	2.760	0.224	0.883	0.265	1.210
Cl	0.329	0.012	0.660	1.000	0.772	0.052	0.477	0.116
K	0.025	0.015	0.204	0.230	0.107	0.056	0.165	0.237
Ca	0.412	0.031	1.920	0.111	0.602	0.015	1.190	0.111
Sc	ND	ND	0.025	ND	0.007	ND	0.017	0.005
Ti	0.010	ND	0.039	0.013	0.041	0.006	0.042	ND
V	ND	ND	0.008	0.007	0.009	ND	0.005	ND
Cr	ND	ND	0.008	0.007	0.006	ND	0.006	ND
Mn	0.005	0.004	0.026	0.031	0.012	0.005	0.024	0.010
Fe	0.120	0.025	1.030	0.355	0.319	0.036	0.637	0.168
Co	ND	ND	0.007	0.004	0.004	0.002	0.004	0.002
Ni	0.001	0.001	0.002	0.004	0.004	0.002	0.002	0.002
Cu	0.005	0.014	0.011	0.019	0.023	0.016	0.007	ND
Zn	0.014	0.026	0.077	0.142	0.039	0.053	0.059	0.087
Ga	0.001	0.003	0.002	ND	ND	0.002	0.001	ND
Ge	ND	ND	0.001	0.001	0.001	0.001	ND	ND
As	ND	ND	ND	0.001	ND	ND	ND	ND
Se	ND	ND	0.001	0.005	0.001	0.002	0.000	0.003
Br	0.002	0.007	0.007	0.050	0.003	0.008	0.002	0.009
Rb	ND	ND	0.001	0.001	0.001	ND	0.001	0.002
Sr	0.002	ND	0.008	0.001	0.005	0.001	0.005	0.001
Y	ND	ND	0.000	0.000	0.001	0.000	0.001	ND
Zr	ND	ND	0.002	ND	0.005	ND	0.003	ND
Nb	ND	ND	ND	ND	0.001	ND	ND	ND
Mo	0.001	0.001	0.001	0.003	0.001	0.001	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	0.004	ND	ND	ND	ND
In	ND	ND	ND	ND	0.003	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND
Te	ND	ND	ND	ND	0.006	ND	ND	ND
I	ND	ND	ND	0.005	0.005	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.015	ND	ND	0.012	0.008	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.013	0.041	0.037	0.108	0.020	0.037	0.022	0.037

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	10-Jan-88 C	10-Jan-88 F	16-Jan-88 C	16-Jan-88 F	22-Jan-88 C	22-Jan-88 F	28-Jan-88 C	28-Jan-88 F
MASS	11.0	24.0	15.0	18.0	29.0	18.0	13.0	24.0
SO4	0.3	3.7	0.3	4.0	0.7	5.5	0.5	4.2
NO3	0.4	2.6	0.5	1.1	0.3	1.2	1.2	3.8
Al	0.091	ND	0.417	ND	1.860	0.530	0.180	0.064
Si	0.273	0.056	1.000	0.067	0.468	0.071	0.315	0.096
P	ND	0.020	0.027	0.023	0.007	0.033	0.016	0.051
S	0.117	1.770	0.172	1.610	0.308	2.550	0.210	2.040
Cl	1.500	0.123	1.280	0.020	0.282	0.159	1.660	0.115
K	0.061	0.165	0.129	0.114	0.084	0.135	0.061	0.148
Ca	0.556	0.034	0.815	0.034	0.987	0.051	0.748	0.048
Sc	ND	ND	0.005	ND	0.017	ND	0.003	ND
Ti	0.019	ND	0.039	ND	0.028	0.007	0.021	0.007
V	ND	ND	0.005	ND	ND	ND	0.005	ND
Cr	ND	ND	ND	ND	0.006	ND	0.004	ND
Mn	0.011	0.014	0.008	0.005	0.019	0.020	0.014	0.018
Fe	0.385	0.176	0.340	0.051	0.560	0.269	0.462	0.200
Co	0.002	ND	0.002	ND	0.004	0.002	0.003	ND
Ni	ND	0.001	ND	ND	0.002	ND	0.003	0.005
Cu	ND	ND	0.002	ND	0.011	0.004	0.004	0.011
Zn	0.024	0.075	0.011	0.025	0.061	0.124	0.085	0.148
Ga	ND	ND	ND	ND	0.001	ND	ND	ND
Ge	ND	ND	ND	ND	ND	ND	0.001	ND
As	ND	0.002	ND	ND	ND	0.001	ND	0.002
Se	ND	0.004	0.000	0.005	0.000	0.005	ND	0.002
Br	0.003	0.020	0.002	0.012	0.003	0.019	0.004	0.020
Rb	0.000	0.000	0.001	ND	0.000	ND	0.000	0.001
Sr	0.003	0.000	0.008	0.000	0.005	ND	0.004	0.001
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	0.001	ND	0.001	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	0.001
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	0.005	ND	ND	ND	ND	ND	ND
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	0.003	ND	ND	ND	ND	ND	0.004
Sb	ND	0.008	ND	0.005	ND	ND	ND	ND
Te	ND	0.004	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.008	ND	0.014	ND	0.008	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.017	0.064	0.013	0.037	0.019	0.048	0.019	0.077

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	3-Feb-88 C	3-Feb-88 F	9-Feb-88 C	9-Feb-88 F	21-Feb-88 C	21-Feb-88 F	27-Feb-88 C	27-Feb-88 F
MASS	6.0	22.0	8.0	24.0	10.0	10.0	11.0	19.0
SO4	0.9	5.3	0.4	5.2	0.3	2.2	0.4	5.3
NO3	0.4	3.1	0.7	3.8	0.2	0.7	0.7	3.5
Al	0.101	0.131	0.327	0.095	0.507	0.144	0.251	ND
Si	0.129	0.116	0.283	0.123	0.321	0.079	0.569	0.071
P	0.002	0.037	ND	0.037	0.006	0.026	0.012	0.020
S	0.251	2.330	0.093	2.350	0.126	1.020	0.211	2.420
Cl	0.120	0.119	0.648	0.096	1.120	0.160	0.648	0.020
K	0.042	0.108	0.045	0.119	0.057	0.097	0.083	0.079
Ca	0.245	0.026	0.321	0.037	0.659	0.041	0.641	0.024
Sc	0.006	ND	0.003	ND	0.009	ND	0.003	ND
Ti	0.012	ND	0.017	ND	0.019	ND	0.026	ND
V	ND	ND	0.007	ND	ND	ND	ND	ND
Cr	0.003	ND	0.005	ND	ND	ND	0.003	ND
Mn	0.004	0.011	0.011	0.016	0.014	0.013	0.009	0.006
Fe	0.139	0.066	0.236	0.112	0.396	0.148	0.301	0.066
Co	0.003	ND	0.003	ND	0.003	0.002	0.003	ND
Ni	0.003	0.002	0.002	0.002	ND	0.002	0.002	0.001
Cu	0.006	0.010	0.015	0.007	0.005	0.004	0.007	0.009
Zn	0.024	0.064	0.020	0.060	0.053	0.094	0.020	0.030
Ga	0.001	ND	ND	ND	0.001	0.002	0.004	0.006
Ge	0.002	0.001	ND	ND	ND	ND	0.002	ND
As	ND	0.001	ND	ND	ND	ND	ND	0.001
Se	0.001	0.002	0.000	0.004	0.000	0.003	0.001	0.002
Br	0.002	0.017	0.003	0.015	0.002	0.009	0.002	0.008
Rb	ND	ND	0.001	0.001	ND	0.000	ND	ND
Sr	0.002	0.000	0.002	0.001	0.003	0.000	0.004	0.000
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	0.002	ND	0.001	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	0.001	0.002	ND	ND	0.001	0.002
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	0.003	ND	0.002	ND	ND
In	ND	0.003	0.004	ND	ND	ND	ND	ND
Sn	ND	0.004	0.004	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND
Te	ND	ND	0.009	ND	ND	ND	ND	ND
I	ND	ND	0.004	ND	ND	0.004	ND	ND
Cs	ND	ND	ND	ND	ND	0.007	ND	ND
Ba	0.009	ND	ND	ND	ND	ND	0.009	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.012	0.067	0.013	0.056	0.009	0.026	0.013	0.030

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	4-Mar-88 C	4-Mar-88 F	10-Mar-88 C	10-Mar-88 F	16-Mar-88 C	16-Mar-88 F	28-Mar-88 C	28-Mar-88 F
MASS	12.0	12.0	10.0	15.0	7.0	6.0	5.0	9.0
SO4	0.3	2.5	0.3	4.8	0.3	1.2	0.2	2.2
NO3	0.2	0.4	0.2	0.5	0.1	0.2	0.2	0.7
Al	0.129	ND	0.084	ND	0.067	ND	0.025	ND
Si	0.532	0.070	0.386	0.058	0.243	0.038	0.154	0.078
P	0.008	0.018	0.005	0.019	ND	0.008	ND	0.013
S	0.100	1.420	0.140	1.850	0.096	0.551	0.027	1.090
Cl	0.624	0.014	0.264	0.011	0.452	0.006	0.032	0.013
K	0.086	0.056	0.068	0.038	0.030	0.033	0.039	0.038
Ca	1.180	0.057	1.130	0.042	0.546	0.035	0.381	0.017
Sc	0.008	ND	0.016	ND	ND	ND	0.009	ND
Ti	0.025	ND	0.025	ND	0.013	ND	0.011	ND
V	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND
Mn	0.012	0.012	0.008	0.008	0.009	0.004	0.004	0.011
Fe	0.343	0.073	0.248	0.054	0.148	0.025	0.136	0.081
Co	0.002	ND	0.003	ND	ND	ND	ND	ND
Ni	0.002	0.002	ND	ND	ND	ND	0.002	ND
Cu	0.009	0.013	0.004	0.002	0.005	0.007	ND	0.009
Zn	0.017	0.031	0.018	0.038	0.011	0.020	0.008	0.031
Ga	0.004	0.004	0.002	0.002	0.003	0.004	0.002	0.003
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	0.000	0.003	0.001	0.002	ND	ND	ND	ND
Se	0.000	0.001	0.000	0.001	ND	ND	ND	0.002
Br	0.002	0.013	0.003	0.017	0.001	0.006	0.001	0.008
Rb	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.005	ND	0.006	ND	0.002	ND	0.002	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	ND	ND	ND	ND	ND	ND
Nb	0.001	ND	ND	ND	ND	0.001	ND	ND
Mo	0.001	0.001	ND	ND	0.001	0.002	0.001	0.001
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	0.002	0.003	ND	ND	ND	ND
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	0.004	ND	ND	ND	ND
Sb	ND	ND	ND	0.005	ND	ND	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	0.007	ND	ND
Ba	0.013	ND	0.008	ND	ND	0.010	ND	ND
La	ND	0.012	ND	ND	ND	0.017	ND	ND
Pb	0.016	0.052	0.013	0.054	0.007	0.027	0.007	0.037

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	3-Apr-88 C	3-Apr-88 F	15-Apr-88 C	15-Apr-88 F	21-Apr-88 C	21-Apr-88 F	27-Apr-88 C	27-Apr-88 F
MASS	7.0	14.0	9.0	13.0	10.0	14.0	12.0	12.0
SO4	0.4	3.6	0.3	2.7	0.3	2.8	0.3	2.3
NO3	0.5	0.5	0.1	0.2	0.3	0.5	0.3	0.5
Al	0.223	0.046	0.092	ND	0.091	ND	0.108	ND
Si	0.208	0.119	0.209	0.040	0.358	0.056	0.323	0.063
P	0.005	0.037	ND	0.010	ND	0.010	0.002	0.014
S	0.113	1.990	0.066	1.120	0.062	1.180	0.080	0.973
Cl	0.065	0.069	0.025	0.015	0.004	0.015	0.082	0.022
K	0.051	0.083	0.061	0.032	0.071	0.078	0.067	0.116
Ca	0.260	0.040	0.534	0.031	0.565	0.051	0.667	0.056
Sc	0.005	ND	0.013	ND	0.014	0.005	0.011	0.005
Ti	0.011	ND	0.018	ND	0.019	ND	0.016	ND
V	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND
Mn	0.007	0.016	0.009	0.006	0.009	0.006	0.013	0.010
Fe	0.282	0.209	0.214	0.042	0.257	0.060	0.349	0.116
Co	0.001	ND	0.002	ND	ND	ND	ND	ND
Ni	ND	0.002	ND	ND	0.001	ND	0.002	0.002
Cu	0.005	0.010	ND	ND	ND	0.003	ND	ND
Zn	0.046	0.146	0.010	0.021	0.016	0.050	0.018	0.051
Ga	0.003	0.004	ND	0.002	ND	0.002	0.001	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	0.002	0.001	0.001	ND	0.001	ND	0.001
Se	ND	0.002	ND	0.001	ND	0.001	ND	0.002
Br	0.002	0.011	0.001	0.010	0.002	0.011	0.001	0.020
Rb	ND	ND	ND	ND	ND	ND	ND	0.000
Sr	0.001	ND	0.002	ND	0.003	ND	0.002	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	ND	ND	0.001	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	0.001	0.002	ND	ND	ND	ND	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	0.002	0.015	ND	0.003	ND	0.003
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	0.003	0.003	ND	ND	ND	ND
Sb	ND	ND	0.004	0.005	0.004	0.004	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.008	ND	0.008	ND	0.008	ND	ND	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.008	0.045	0.008	0.040	0.012	0.045	0.007	0.032

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	3-May-88 C	3-May-88 F	15-May-88 C	15-May-88 F	21-May-88 C	21-May-88 F	27-May-88 C	27-May-88 F
MASS	12.0	12.0	21.0	18.0	29.0	54.0	35.0	29.0
SO4	0.3	3.3	0.3	5.6	1.3	17.3	0.5	8.7
NO3	0.5	0.1	0.5	0.1	0.1	0.5	1.2	0.2
Al	0.275	ND	0.510	0.049	0.788	1.330	0.317	0.042
Si	0.754	0.054	0.862	0.097	0.385	0.135	1.090	0.162
P	0.006	0.010	0.009	0.013	ND	0.043	0.011	0.027
S	0.102	1.330	0.110	1.840	0.623	5.530	0.111	3.440
Cl	0.014	ND	0.042	ND	0.188	0.043	0.428	0.032
K	0.162	0.033	0.165	0.071	0.122	0.285	0.304	0.606
Ca	1.080	0.046	0.994	0.062	1.120	0.133	2.700	0.313
Sc	0.028	0.005	0.013	ND	0.012	ND	0.051	0.003
Ti	0.038	ND	0.049	ND	0.036	0.010	0.071	0.008
V	ND	ND	ND	ND	0.004	0.006	0.007	ND
Cr	0.004	ND	0.005	ND	0.007	0.004	0.006	0.004
Mn	0.011	0.012	0.019	0.012	0.027	0.027	0.071	0.043
Fe	0.351	0.059	0.600	0.150	0.917	0.402	1.690	0.583
Co	0.002	ND	0.003	ND	0.006	0.002	0.009	0.004
Ni	0.003	ND	ND	ND	0.003	0.004	0.002	0.002
Cu	ND	ND	ND	ND	0.002	0.007	ND	0.005
Zn	0.009	0.027	0.059	0.116	0.121	0.222	0.111	0.251
Ga	ND	ND	ND	ND	ND	ND	ND	0.003
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	0.001	ND	0.001	0.001	0.002	ND	0.002
Se	ND	ND	ND	0.001	0.001	0.004	0.000	0.004
Br	0.002	0.006	0.001	0.007	0.005	0.016	0.004	0.037
Rb	0.000	ND	0.001	ND	0.000	0.001	0.002	0.003
Sr	0.004	ND	0.005	ND	0.005	0.003	0.009	0.001
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	0.001	ND	0.001	ND	0.003	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	0.003	0.002	0.004	0.005	0.005	ND	0.003
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	0.004	ND	0.004	0.004	ND	ND	0.004
Sb	0.003	0.007	0.005	0.008	0.003	0.007	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.009	ND	0.009	ND	0.010	ND	0.019	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.010	0.031	0.014	0.036	0.026	0.098	0.020	0.119

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	2-Jun-88 C	2-Jun-88 F	8-Jun-88 C	8-Jun-88 F	14-Jun-88 C	14-Jun-88 F	20-Jun-88 C	20-Jun-88 F
MASS	6.0	4.0	13.0	9.0	42.0	50.0	37.0	39.0
SO4	0.1	0.8	0.2	1.8	0.5	17.1	0.6	14.4
NO3	0.1	0.0	0.1	0.0	1.1	0.1	0.9	0.0
Al	ND	ND	0.079	ND	1.810	0.485	1.310	0.297
Si	0.142	0.008	0.469	0.042	1.230	0.108	1.160	0.059
P	ND	ND	0.002	0.002	0.018	0.043	0.020	0.023
S	0.004	0.291	0.060	0.575	0.269	4.820	0.282	4.600
Cl	ND	ND	0.011	ND	0.203	ND	0.084	0.008
K	0.030	0.006	0.126	0.027	0.316	0.583	0.315	0.203
Ca	0.536	0.041	1.390	0.041	3.050	0.215	2.410	0.125
Sc	0.009	ND	0.018	ND	0.051	ND	0.030	ND
Ti	0.013	ND	0.036	ND	0.091	0.007	0.076	0.008
V	ND	ND	0.006	0.005	0.008	ND	0.011	ND
Cr	ND	ND	ND	ND	0.012	ND	0.010	0.004
Mn	0.004	ND	0.008	0.003	0.057	0.028	0.055	0.028
Fe	0.156	0.023	0.300	0.039	1.550	0.382	1.720	0.757
Co	ND	ND	ND	ND	0.009	0.002	0.011	0.004
Ni	ND	ND	0.002	ND	0.001	0.001	0.002	ND
Cu	ND	ND	ND	ND	0.002	ND	ND	ND
Zn	0.002	0.008	0.008	0.018	0.071	0.127	0.284	0.361
Ga	ND	ND	ND	ND	ND	ND	ND	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	0.001	ND	ND	0.001	0.001	0.002	0.001	0.001
Se	ND	ND	ND	0.001	ND	0.002	ND	0.002
Br	0.001	0.002	0.001	0.003	0.005	0.043	0.003	0.011
Rb	ND	ND	ND	ND	0.002	0.002	0.002	0.001
Sr	0.001	ND	0.005	ND	0.013	0.001	0.011	0.001
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	ND	ND	0.004	ND	0.003	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND
Pd	0.002	ND	ND	ND	0.002	ND	ND	ND
Ag	0.004	ND	ND	0.002	0.002	0.004	ND	0.003
Cd	0.004	0.005	0.003	0.003	0.003	0.007	0.002	0.007
In	0.004	ND	ND	0.003	0.002	0.004	ND	0.003
Sn	0.009	0.005	0.005	0.007	0.007	0.015	0.002	0.010
Sb	0.016	0.007	0.008	0.012	0.011	0.018	0.005	0.013
Te	0.006	ND	ND	0.004	0.003	0.008	ND	0.006
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	0.011	0.016	ND	0.016	ND	0.010	ND
La	ND	ND	ND	ND	ND	ND	ND	0.012
Pb	0.003	0.020	0.007	0.029	0.017	0.062	0.023	0.048

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	26-Jun-88 C	26-Jun-88 F	2-Jul-88 C	2-Jul-88 F	8-Jul-88 C	8-Jul-88 F	14-Jul-88 C	14-Jul-88 F
MASS	11.0	8.0	16.0	19.0	36.0	66.0	26.0	34.0
SO4	0.1	1.5	0.2	3.0	0.4	28.9	0.5	11.3
NO3	0.0	0.0	0.5	0.1	1.1	0.0	0.7	0.1
Al	0.470	0.279	0.406	0.237	1.390	0.040	0.976	0.263
Si	0.197	0.022	0.316	0.032	1.080	ND	0.646	0.056
P	ND	0.002	0.001	0.008	0.018	ND	0.009	0.013
S	0.023	0.611	0.029	1.030	0.805	3.450	0.201	3.190
Cl	ND	ND	0.038	0.007	0.024	ND	0.107	ND
K	0.062	0.018	0.108	0.200	0.248	0.019	0.191	0.112
Ca	0.418	0.018	0.941	0.112	2.060	0.080	1.390	0.087
Sc	0.015	ND	0.020	0.014	0.032	0.005	0.031	0.004
Ti	0.017	ND	0.032	0.008	0.071	ND	0.051	0.007
V	ND	ND	ND	0.005	0.008	ND	0.007	0.007
Cr	ND	ND	0.005	0.013	0.007	ND	0.004	ND
Mn	0.004	ND	0.019	0.023	0.028	0.009	0.025	0.014
Fe	0.140	0.016	0.518	0.217	0.799	0.109	0.780	0.184
Co	ND	ND	0.002	0.003	0.004	ND	0.003	ND
Ni	ND	ND	0.002	0.002	0.002	ND	0.002	0.001
Cu	ND	ND	ND	0.005	ND	ND	ND	ND
Zn	0.003	0.006	0.065	0.336	0.046	0.044	0.056	0.061
Ga	ND	0.001	ND	0.002	ND	ND	ND	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	0.001	0.002	0.001	0.001	0.001	ND
Se	ND	ND	ND	0.001	ND	ND	ND	0.004
Br	0.001	0.003	0.003	0.012	0.003	0.007	0.001	0.004
Rb	ND	ND	0.000	ND	0.001	ND	0.001	ND
Sr	0.001	ND	0.004	0.002	0.010	0.001	0.005	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.000	ND	0.000	ND	0.003	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND
Pd	ND	ND	ND	ND	ND	0.002	ND	0.002
Ag	0.002	ND	0.002	ND	ND	0.004	0.002	ND
Cd	0.003	ND	0.003	0.003	ND	0.008	ND	0.007
In	ND	ND	0.004	ND	ND	0.014	ND	0.003
Sn	0.005	ND	0.006	0.004	ND	0.028	0.004	0.008
Sb	0.010	ND	0.011	0.005	0.000	0.054	0.010	0.016
Te	ND	ND	0.006	ND	ND	0.030	ND	0.005
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.011	0.014	0.011	ND	0.014	ND
La	ND	ND	ND	ND	ND	ND	0.009	0.016
Pb	0.005	0.012	0.016	0.064	0.020	0.046	0.009	0.036

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	20-Jul-88 C	20-Jul-88 F	26-Jul-88 C	26-Jul-88 F	7-Aug-88 C	7-Aug-88 F	13-Aug-88 C	13-Aug-88 F
MASS	11.0	10.0	10.0	23.0	22.0	32.0	38.0	10.0
SO4	0.4	1.5	ND	7.2	0.3	6.5	0.6	29.0
NO3	0.4	0.1	0.6	0.1	1.1	0.1	1.9	0.1
Al	0.214	ND	0.630	0.375	1.050	0.224	2.070	0.656
Si	0.413	0.060	0.284	0.141	0.690	0.050	1.370	0.416
P	0.015	0.005	0.007	0.039	0.028	0.017	0.035	0.067
S	0.158	0.629	ND	3.360	0.167	2.780	0.510	9.200
Cl	0.054	ND	0.039	ND	0.181	0.014	0.250	ND
K	0.089	0.045	0.067	0.078	0.154	0.111	0.270	0.175
Ca	1.190	0.178	0.764	0.124	1.450	0.088	1.400	0.104
Sc	0.013	0.005	0.014	ND	0.020	0.007	0.025	0.004
Ti	0.034	ND	0.018	0.007	0.052	0.012	0.073	0.023
V	ND	ND	ND	ND	0.007	ND	0.008	ND
Cr	ND	ND	ND	ND	0.007	ND	0.010	ND
Mn	0.007	0.010	0.007	0.018	0.028	0.027	0.036	0.036
Fe	0.283	0.060	0.245	0.159	0.799	0.374	1.180	0.470
Co	ND	ND	ND	ND	0.004	0.003	0.008	0.003
Ni	0.003	0.001	0.005	0.004	0.001	0.001	0.002	0.001
Cu	ND	ND	0.002	0.008	0.004	ND	0.012	0.006
Zn	0.014	0.033	0.021	0.086	0.127	0.245	0.241	0.260
Ga	ND	ND	0.001	0.002	0.002	ND	0.002	0.001
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	0.001	ND	0.001	0.000	0.002	0.001	0.001
Se	ND	0.001	ND	0.002	ND	0.003	0.001	0.005
Br	0.002	0.004	0.000	0.007	0.003	0.014	0.006	0.017
Rb	ND	ND	ND	ND	0.001	ND	0.001	0.001
Sr	0.004	ND	0.003	0.001	0.005	0.000	0.006	0.002
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.002	ND	ND	ND	0.002	ND	0.003	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	0.001	ND	ND	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	0.002	ND	ND	ND	ND	ND	ND	ND
Cd	0.003	0.004	ND	0.003	ND	0.005	ND	0.005
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.003	0.007	ND	ND	ND	0.007	ND	0.005
Sb	0.003	0.012	ND	ND	ND	0.006	ND	0.006
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.013	0.009	0.010	ND	0.011	ND	0.009	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.041	0.049	0.004	0.047	0.025	0.072	0.014	0.052

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	19-Aug-88 C	19-Aug-88 F	25-Aug-88 C	25-Aug-88 F	31-Aug-88 C	31-Aug-88 F	6-Sep-88 C	6-Sep-88 F
MASS	11.0	10.0	19.0	16.0	21.0	22.0	7.0	6.0
SO4	0.2	2.8	0.4	2.8	0.4	6.6	0.3	1.1
NO3	0.9	0.0	0.3	0.0	1.4	0.1	0.1	0.0
Al	0.257	ND	0.737	0.289	0.469	ND	0.096	ND
Si	0.446	0.039	0.804	0.100	0.875	0.085	0.247	0.008
P	ND	0.002	0.021	0.038	0.035	0.021	0.009	0.012
S	0.076	1.160	0.162	1.500	0.258	2.600	0.110	0.413
Cl	0.008	ND	0.191	ND	0.301	0.007	0.030	ND
K	0.099	0.044	0.167	0.150	0.190	0.166	0.061	0.037
Ca	0.966	0.050	1.360	0.085	2.080	0.117	0.669	0.050
Sc	0.011	ND	0.019	ND	0.029	ND	0.013	0.008
Ti	0.022	0.007	0.040	ND	0.044	0.008	0.013	ND
V	ND	ND	ND	ND	0.005	ND	ND	ND
Cr	ND	ND	0.004	0.004	0.008	0.004	0.003	ND
Mn	0.008	0.009	0.026	0.019	0.038	0.030	0.009	0.009
Fe	0.228	0.046	0.859	0.223	1.080	0.364	0.237	0.056
Co	ND	ND	0.004	ND	0.006	0.002	ND	ND
Ni	0.001	ND	0.001	0.002	0.003	0.002	ND	ND
Cu	0.002	0.005	0.001	0.008	0.006	0.009	ND	ND
Zn	0.011	0.019	0.079	0.122	0.098	0.186	0.022	0.048
Ga	0.001	0.003	0.001	0.003	0.003	0.002	0.002	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	0.002	ND	ND	ND	ND
Se	ND	0.001	ND	0.002	0.000	0.003	ND	ND
Br	0.002	0.005	0.002	0.009	0.005	0.026	0.002	0.008
Rb	ND	ND	0.001	0.001	0.001	0.000	ND	ND
Sr	0.003	ND	0.005	0.001	0.008	0.001	0.002	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.000	ND	0.002	ND	0.002	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	0.001	ND	0.001	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	0.005	ND	0.005	ND	0.005
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	0.005	ND	0.004
Sb	ND	ND	ND	ND	ND	0.006	ND	0.006
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	0.008	ND	ND
Ba	ND	0.011	ND	ND	0.015	0.009	0.012	ND
La	ND	ND	ND	ND	ND	0.013	ND	ND
Pb	0.008	0.034	0.015	0.039	0.026	0.078	0.012	0.039

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	12-Sep-88 C	12-Sep-88 F	18-Sep-88 C	18-Sep-88 F	24-Sep-88 C	24-Sep-88 F	30-Sep-88 C	30-Sep-88 F
MASS	18.0	27.0	20.0	31.0	11.0	9.0	23.0	38.0
SO4	0.5	6.7	0.7	11.5	0.2	1.9	1.3	14.3
NO3	1.1	0.5	1.1	0.2	0.3	0.1	1.6	0.3
Al	0.824	0.158	1.020	0.225	ND	ND	0.385	ND
Si	0.642	0.151	0.459	0.099	0.024	0.040	0.530	0.058
P	0.012	0.028	0.029	0.046	ND	0.008	0.010	0.037
S	0.177	2.920	0.418	4.790	ND	0.825	0.571	4.910
Cl	0.082	ND	0.242	ND	ND	ND	0.138	ND
K	0.124	0.105	0.142	0.170	0.003	0.043	0.141	0.193
Ca	0.893	0.055	1.130	0.090	0.462	0.063	1.410	0.080
Sc	0.018	0.005	0.017	ND	0.005	ND	0.022	ND
Ti	0.038	0.007	0.027	0.008	0.007	0.006	0.046	0.009
V	ND	ND	0.004	ND	ND	0.005	0.006	ND
Cr	0.005	ND	0.007	0.003	ND	ND	0.006	0.003
Mn	0.013	0.015	0.024	0.031	0.004	0.012	0.033	0.042
Fe	0.441	0.117	0.928	0.422	0.188	0.061	1.210	0.523
Co	0.002	ND	0.005	0.003	ND	ND	0.006	0.002
Ni	ND	ND	0.001	0.002	ND	ND	0.002	0.002
Cu	0.001	0.007	0.012	0.023	ND	ND	0.002	0.006
Zn	0.021	0.079	0.151	0.259	0.002	0.029	0.089	0.216
Ga	0.001	0.001	0.001	0.002	ND	ND	ND	ND
Ge	ND	ND	ND	0.001	ND	ND	ND	ND
As	ND	0.001	ND	0.002	0.001	0.001	0.001	0.001
Se	0.000	0.004	ND	0.005	ND	ND	0.000	0.006
Br	0.003	0.014	0.003	0.013	0.001	0.006	0.006	0.041
Rb	ND	ND	0.000	0.001	ND	ND	0.000	0.000
Sr	0.003	ND	0.004	0.000	0.001	ND	0.006	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	0.000	ND	ND	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	0.003	ND	ND	ND
Cd	0.002	ND	ND	0.008	0.003	ND	0.001	0.012
In	ND	ND	ND	ND	0.009	ND	ND	ND
Sn	ND	0.005	ND	0.005	0.017	ND	ND	0.006
Sb	0.004	0.005	ND	ND	0.032	ND	ND	0.005
Te	ND	ND	ND	ND	0.020	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.015	ND	0.010	ND	0.008	ND	0.014	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.014	0.123	0.020	0.071	0.003	0.033	0.021	0.094

Table F4: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Windsor

PARAMETER	6-Oct-88 C	6-Oct-88 F	12-Oct-88 C	12-Oct-88 F	24-Oct-88 C	24-Oct-88 F
MASS	8.0	11.0	5.0	5.0	10.0	13.0
SO4	0.1	1.4	0.1	0.6	0.5	3.1
NO3	0.1	0.0	0.1	0.1	0.2	0.4
Al	ND	ND	0.067	ND	0.103	ND
Si	0.144	0.032	0.105	0.026	0.361	0.066
P	ND	0.004	ND	0.004	0.003	0.014
S	0.018	0.558	0.030	0.261	0.141	1.210
Cl	ND	ND	0.006	ND	0.189	0.171
K	0.042	0.063	0.025	0.017	0.067	0.315
Ca	0.673	0.092	0.307	0.026	0.463	0.129
Sc	0.014	0.015	0.014	ND	ND	0.006
Ti	0.015	ND	ND	ND	0.017	ND
V	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND
Mn	0.006	0.010	0.003	0.004	0.013	0.022
Fe	0.225	0.068	0.080	0.024	0.612	0.494
Co	ND	ND	ND	ND	0.002	0.002
Ni	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	0.008
Zn	0.012	0.037	0.008	0.023	0.035	0.130
Ga	ND	0.003	0.002	0.003	0.002	0.004
Ge	ND	ND	ND	ND	ND	ND
As	ND	0.001	ND	0.001	ND	0.001
Se	ND	ND	ND	ND	0.000	0.006
Br	0.002	0.012	0.001	0.004	0.001	0.012
Rb	ND	ND	ND	ND	0.000	0.002
Sr	0.002	ND	0.001	ND	0.001	ND
Y	ND	ND	ND	ND	ND	ND
Zr	ND	ND	ND	ND	0.001	ND
Nb	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	0.002
Pd	ND	ND	ND	ND	ND	0.002
Ag	ND	ND	ND	ND	ND	0.002
Cd	ND	ND	ND	0.002	0.003	0.010
In	ND	ND	ND	ND	ND	ND
Sn	0.005	ND	ND	ND	0.003	0.009
Sb	0.010	ND	ND	ND	0.008	0.009
Te	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.007	ND	0.010	ND
La	ND	ND	ND	ND	ND	ND
Pb	0.009	0.046	0.004	0.022	0.004	0.035

Table F5: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Walpole Island

PARAMETER	22-Jan-88 C	22-Jan-88 F	28-Jan-88 C	28-Jan-88 F	9-Feb-88 C	9-Feb-88 F	15-Feb-88 C	15-Feb-88 F
MASS	8.0	10.0	11.0	15.0	8.0	16.0	6.0	15.0
SO4	0.2	2.0	0.2	3.0	0.1	4.4	0.2	4.2
NO3	0.2	0.0	0.5	1.0	0.4	0.6	0.1	0.0
Al	0.047	ND	0.066	0.080	0.280	0.082	ND	0.130
Si	0.154	0.053	0.267	0.113	0.541	0.131	0.033	0.076
P	ND	0.015	ND	0.023	0.010	0.028	ND	0.029
S	0.093	1.050	0.085	1.590	0.289	1.990	0.089	1.830
Cl	0.037	0.005	0.212	0.037	0.044	0.005	0.003	0.005
K	0.032	0.046	0.048	0.081	0.048	0.069	0.017	0.057
Ca	0.347	0.017	0.772	0.079	0.093	0.027	0.030	0.015
Sc	0.009	ND	0.012	ND	ND	ND	ND	ND
Ti	0.008	ND	0.011	ND	0.010	0.007	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND
Mn	0.006	0.008	0.004	0.008	0.003	0.007	ND	0.004
Fe	0.118	0.072	0.140	0.087	0.084	0.065	0.019	0.020
Co	ND	ND	ND	ND	ND	ND	ND	ND
Ni	ND	ND	ND	0.001	ND	0.001	ND	ND
Cu	0.006	0.007	0.004	0.006	0.006	0.007	0.003	0.004
Zn	0.013	0.032	0.015	0.043	0.008	0.034	0.002	0.011
Ga	0.002	0.003	0.002	0.002	0.001	0.002	0.001	ND
Ge	ND	ND	0.001	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	0.001	ND	ND
Se	0.000	0.001	ND	0.002	0.000	0.002	ND	0.002
Br	0.000	0.003	0.000	0.005	0.000	0.004	ND	0.003
Rb	ND	ND	ND	ND	ND	0.000	ND	ND
Sr	0.001	ND	0.002	0.001	0.001	0.001	ND	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	0.001	ND	ND	ND	ND	ND
Nb	0.000	ND	ND	ND	ND	ND	ND	ND
Mo	0.001	0.001	0.001	0.001	0.001	0.001	ND	0.001
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	ND	0.013	ND	ND
La	ND	ND	ND	ND	ND	0.017	ND	ND
Pb	0.002	0.008	0.003	0.016	0.004	0.018	0.001	0.011

Table F5: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Walpole Island

PARAMETER	10-Mar-88 C	10-Mar-88 F	9-Apr-88 C	9-Apr-88 F	21-Apr-88 C	21-Apr-88 F	27-Apr-88 C	27-Apr-88 F
MASS	6.0	11.0	3.0	11.0	3.0	9.0	5.0	8.0
SO4	0.2	3.1	0.2	2.0	0.2	2.4	0.2	1.8
NO3	0.1	0.1	0.1	0.1	0.2	0.4	0.2	0.3
Al	0.243	0.074	0.087	0.064	0.080	0.040	0.128	0.039
Si	0.076	0.029	0.117	0.060	0.272	0.075	0.376	0.105
P	ND	0.008	ND	0.019	0.001	0.012	0.004	0.013
S	0.071	1.250	0.060	1.070	0.050	1.270	0.067	0.981
Cl	0.009	ND	0.008	0.039	0.013	0.010	0.022	0.019
K	0.009	0.011	0.014	0.184	0.038	0.030	0.042	0.035
Ca	0.173	0.016	0.184	0.022	0.220	0.019	0.247	0.032
Sc	ND	ND	ND	ND	ND	ND	0.003	ND
Ti	0.012	ND	ND	ND	0.008	ND	0.009	ND
V	0.007	0.005	0.006	0.008	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND
Mn	0.003	ND	ND	ND	0.003	ND	0.003	0.003
Fe	0.035	0.013	0.042	0.014	0.081	0.031	0.096	0.034
Co	ND	ND	ND	ND	ND	ND	ND	ND
Ni	0.002	ND	0.007	0.003	ND	ND	ND	ND
Cu	0.014	0.002	0.009	0.007	0.004	0.006	0.006	0.009
Zn	0.004	0.004	0.003	0.013	0.002	0.010	0.006	0.017
Ga	ND	ND	0.002	0.002	0.001	0.003	0.002	0.004
Ge	ND	ND	0.001	ND	ND	ND	ND	ND
As	ND	ND	ND	0.002	ND	0.001	ND	0.001
Se	0.001	0.001	0.001	0.002	ND	0.001	ND	0.001
Br	0.000	0.001	0.000	0.007	0.000	0.003	0.000	0.002
Rb	0.001	ND	ND	ND	ND	ND	ND	ND
Sr	0.001	0.000	0.001	ND	0.001	0.000	0.001	ND
Y	0.000	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	0.000	ND	ND	ND	0.000	ND
Nb	ND	ND	0.001	ND	0.000	ND	ND	ND
Mo	ND	ND	0.002	0.001	0.001	ND	0.001	0.001
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND
Te	0.004	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	ND	ND	ND	ND
La	ND	ND	ND	ND	ND	ND	0.011	ND
Pb	0.003	0.006	0.002	0.009	0.001	0.006	ND	0.007

Table F5: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Walpole Island

PARAMETER	3-May-88 C	3-May-88 F	9-May-88 C	9-May-88 F	14-Jun-88 C	14-Jun-88 F	20-Jun-88 C	20-Jun-88 F
MASS	15.0	10.0	16.0	12.0	37.0	37.0	26.0	33.0
SO4	0.2	3.0	0.3	3.6	0.7	11.8	0.6	11.6
NO3	0.4	0.4	0.4	0.2	0.9	0.1	0.6	0.1
Al	0.486	0.099	0.864	0.190	0.549	0.180	0.597	0.110
Si	1.470	0.130	2.490	0.327	1.950	0.221	1.440	0.137
P	0.021	0.027	0.025	0.026	0.012	0.051	0.016	0.044
S	0.121	1.650	0.140	1.800	0.208	5.020	0.170	4.750
Cl	0.051	0.017	0.041	0.013	0.024	0.007	0.023	0.007
K	0.200	0.046	0.209	0.054	0.343	0.302	0.275	0.092
Ca	1.140	0.057	0.365	0.047	1.480	0.116	1.100	0.082
Sc	0.015	ND	0.003	ND	0.024	ND	0.014	ND
Ti	0.035	ND	0.057	0.008	0.087	0.014	0.073	0.011
V	ND	ND	ND	ND	0.008	ND	0.010	ND
Cr	ND	ND	ND	ND	0.003	ND	0.006	ND
Mn	0.007	0.003	0.012	0.005	0.024	0.012	0.020	0.007
Fe	0.265	0.036	0.380	0.086	0.757	0.158	0.555	0.094
Co	0.002	ND	0.003	ND	0.004	ND	0.005	ND
Ni	0.002	ND	ND	ND	0.001	0.002	0.002	ND
Cu	0.008	0.008	0.007	0.005	ND	0.005	0.016	ND
Zn	0.005	0.012	0.006	0.010	0.028	0.062	0.020	0.035
Ga	0.003	0.002	0.002	0.001	ND	ND	ND	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	0.001	ND	ND	ND
Se	ND	0.001	0.000	0.002	ND	0.002	0.001	0.002
Br	0.000	0.003	0.001	0.002	0.001	0.006	0.001	0.004
Rb	0.001	ND	0.001	0.001	0.002	0.001	0.002	ND
Sr	0.003	0.000	0.002	0.001	0.007	0.002	0.006	0.001
Y	0.000	ND	0.001	ND	0.000	ND	0.001	ND
Zr	0.002	0.001	0.002	ND	0.003	0.002	0.003	ND
Nb	0.001	ND	0.000	ND	ND	ND	0.001	ND
Mo	0.001	0.001	0.001	ND	ND	ND	ND	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	ND	ND	ND	ND	ND	ND	0.004	0.004
Sn	ND	ND	ND	ND	ND	ND	0.004	0.004
Sb	ND	ND	ND	ND	ND	ND	0.008	0.008
Te	ND	ND	ND	ND	ND	0.004	0.011	0.006
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	0.008	ND	ND	ND	ND	ND	ND
Ba	ND	ND	0.009	ND	ND	ND	ND	ND
La	0.010	ND	ND	ND	ND	ND	ND	ND
Pb	0.002	0.010	0.002	0.006	0.005	0.018	0.007	0.013

Table F5: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Walpole Island

PARAMETER	2-Jul-88 C	2-Jul-88 F	8-Jul-88 C	8-Jul-88 F	20-Jul-88 C	20-Jul-88 F	26-Jul-88 C	26-Jul-88 F
MASS	8.0	8.0	19.0	51.0	12.0	7.0	8.0	12.0
SO4	0.1	0.7	1.0	23.9	0.1	0.9	0.2	3.6
NO3	0.1	0.0	1.0	0.0	0.2	0.1	0.2	0.1
Al	0.144	ND	0.380	0.089	0.017	ND	0.049	ND
Si	0.446	0.031	1.200	0.137	0.174	0.027	0.173	0.017
P	0.003	ND	0.015	0.083	0.031	0.003	0.021	0.014
S	0.028	0.295	0.525	8.650	0.045	0.488	0.133	1.560
Cl	0.019	ND	0.010	0.018	0.017	ND	0.020	0.015
K	0.096	0.053	0.187	0.058	0.091	0.028	0.052	0.020
Ca	0.460	0.070	0.956	0.063	0.327	0.036	0.167	0.032
Sc	0.008	0.009	0.012	ND	0.011	ND	0.003	0.007
Ti	0.018	ND	0.044	0.011	0.007	ND	ND	ND
V	ND	ND	0.005	ND	ND	ND	ND	ND
Cr	ND	ND	0.004	ND	ND	ND	ND	ND
Mn	0.005	0.003	0.012	0.003	0.003	0.003	0.002	0.004
Fe	0.153	0.021	0.374	0.065	0.075	0.018	0.072	0.018
Co	ND	ND	0.002	ND	ND	ND	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	0.002	ND
Zn	0.003	0.004	0.019	0.022	0.001	0.007	0.004	0.007
Ga	ND	ND	ND	ND	ND	ND	0.002	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	0.001	ND	ND	ND	ND
Se	ND	ND	0.001	0.002	ND	0.003	0.000	0.001
Br	ND	0.001	0.001	0.005	0.001	0.002	0.001	0.001
Rb	0.000	ND	0.001	ND	ND	ND	ND	ND
Sr	0.001	ND	0.003	0.001	ND	ND	0.001	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	0.001	ND	ND	ND	ND	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	0.001	ND
Pd	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND
In	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	0.004	ND	ND	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND
I	ND	ND	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.009	ND	0.012	ND	ND	ND	ND	ND
La	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.001	0.004	0.005	0.011	0.001	0.012	0.002	0.007

Table F5: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Walpole Island

PARAMETER	1-Aug-88 C	1-Aug-88 F	13-Aug-88 C	13-Aug-88 F	19-Aug-88 C	19-Aug-88 F	25-Aug-88 C	25-Aug-88 F
MASS	11.0	30.0	1.0	5.0	12.0	11.0	12.0	13.0
SO4	0.5	8.9	0.0	0.0	0.1	0.9	0.2	1.8
NO3	0.8	0.2	ND	0.1	0.6	0.1	0.2	0.0
Al	0.285	0.109	0.212	0.013	0.044	ND	0.071	ND
Si	0.662	0.205	ND	ND	0.201	ND	0.416	0.025
P	0.031	0.044	ND	ND	0.003	ND	0.015	ND
S	0.257	3.960	ND	ND	0.026	0.308	0.065	0.701
Cl	0.018	0.007	ND	ND	0.022	ND	0.019	ND
K	0.129	0.053	ND	ND	0.083	0.025	0.134	0.063
Ca	0.370	0.046	0.009	ND	0.651	0.045	0.446	0.062
Sc	0.010	ND	ND	ND	0.011	ND	0.005	0.005
Ti	0.018	0.006	ND	ND	0.016	ND	0.020	ND
V	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND
Mn	0.006	0.003	ND	ND	0.004	ND	0.008	0.004
Fe	0.201	0.089	0.003	ND	0.111	0.017	0.223	0.057
Co	ND	ND	0.002	ND	ND	ND	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND
Cu	0.004	ND	0.005	ND	ND	ND	ND	ND
Zn	0.009	0.025	ND	ND	0.002	0.005	0.017	0.033
Ga	0.001	ND	ND	ND	ND	ND	ND	ND
Ge	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	0.001	ND	ND
Se	0.000	0.004	ND	ND	ND	ND	ND	ND
Br	0.001	0.003	ND	ND	0.000	0.002	ND	0.001
Rb	0.001	ND	0.000	ND	ND	ND	ND	ND
Sr	0.002	0.000	ND	ND	0.001	ND	0.001	ND
Y	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.001	ND	ND	ND	ND	ND	ND	ND
Nb	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND
Pd	ND	ND	0.002	ND	ND	ND	ND	ND
Ag	ND	ND	0.002	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	0.002
In	ND	ND	0.006	0.004	ND	ND	ND	0.004
Sn	ND	ND	0.007	0.005	0.005	0.004	ND	0.005
Sb	ND	ND	0.011	0.009	0.010	0.007	0.003	0.012
Te	ND	ND	0.012	0.010	0.004	0.004	ND	0.006
I	ND	ND	0.004	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	ND	ND	ND	ND
La	ND	ND	ND	0.012	ND	ND	ND	ND
Pb	0.005	0.016	0.003	0.015	0.033	0.020	0.003	0.037

Table F5: IP and Associated Element Concentrations ($\mu g/m^3$) by Sampling Day - Walpole Island

PARAMETER	31-Aug-88 C	31-Aug-88 F	6-Sep-88 C	O6-SEP-88 F	12-Sep-88 C	12-Sep-88 F
MASS	12.0	11.0	3.0	3.0	8.0	22.0
SO4	0.3	3.3	0.1	0.5	0.4	4.0
NO3	0.7	0.3	0.1	0.1	0.5	0.5
Al	ND	0.039	ND	ND	ND	ND
Si	0.002	0.442	0.016	0.039	0.168	0.119
P	0.017	0.007	ND	ND	0.000	0.016
S	1.130	0.199	ND	0.205	0.029	1.500
Cl	ND	0.015	ND	ND	ND	0.013
K	0.021	0.135	0.005	ND	0.038	0.070
Ca	ND	1.040	0.097	0.006	0.324	0.056
Sc	0.004	0.018	0.016	ND	ND	0.012
Ti	ND	0.027	ND	ND	0.022	0.009
V	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND
Mn	0.004	0.009	ND	ND	0.005	0.004
Fe	0.032	0.279	0.026	0.008	0.140	0.064
Co	ND	ND	ND	ND	ND	ND
Ni	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND
Zn	0.027	0.013	0.001	0.014	0.008	0.022
Ga	ND	ND	ND	ND	ND	ND
Ge	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	0.001
Se	0.001	ND	ND	ND	ND	0.002
Br	0.002	0.000	ND	0.001	0.000	0.004
Rb	ND	0.000	ND	ND	ND	ND
Sr	ND	0.002	ND	ND	0.001	ND
Y	ND	ND	ND	ND	ND	ND
Zr	ND	0.001	ND	ND	ND	ND
Nb	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND
Pd	ND	ND	ND	ND	0.001	ND
Ag	0.002	ND	ND	ND	0.002	ND
Cd	0.003	ND	ND	ND	0.002	ND
In	ND	ND	ND	ND	0.006	0.003
Sn	0.006	ND	0.004	0.004	0.011	ND
Sb	0.012	0.007	0.009	0.005	0.021	0.006
Te	0.006	ND	0.005	0.004	0.018	0.004
I	ND	ND	ND	ND	ND	ND
Cs	ND	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	ND	ND
La	ND	ND	ND	ND	ND	ND
Pb	0.015	0.006	0.001	0.009	0.001	0.016

APPENDIX G

Meteorological Parameters and Concentrations of Selected Parameters by Wind Direction

Table G1: Meteorological Parameters - Windsor

	1-Aug-87	7-Aug-87	13-Aug-87	19-Aug-87	25-Aug-87	31-Aug-87	6-Sep-87	12-Sep-87	18-Sep-87	24-Sep-87
MEAN TEMP (°C)	21.5	23.6	25.2	22.4	16.6	17.9	18.3	19.2	17.3	14.4
HIGH TEMP (°C)	24.4	27.5	30.4	27.5	20.8	23.7	22	20.5	18	17.4
LOW TEMP (°C)	18.8	17.8	20	17.2	12.3	12	15.3	17.4	15.7	12
WIND DIR.	ESE	S	S	W	WSW	W	S	SE	NNE	NNE
WIND SPEED (km/h)	9	16	11.2	17.2	9.1	15	13	11	12	13

	30-Sep-87	6-Oct-87	12-Oct-87	18-Oct-87	24-Oct-87	30-Oct-87	5-Nov-87	11-Nov-87	17-Nov-87	23-Nov-87
MEAN TEMP (°C)	12.2	10.2	6.2	11.2	4.2	9.5	5.2	1.2	13.4	6.5
HIGH TEMP (°C)	17.3	13.8	8.9	13.7	6.3	16.3	10.7	3.8	15.1	11.1
LOW TEMP (°C)	7.1	6.5	2.7	9.7	2.5	3.4	1.2	-0.9	10.2	1.9
WIND DIR.	NW	W	W	SSW	W	S	NW	WSW	S	SSW
WIND SPEED (km/h)	16.2	15	13	20	16	21	33	20	33	24.1

	29-Nov-87	5-Dec-87	11-Dec-87	17-Dec-87	23-Dec-87	29-Dec-87	4-Jan-88	10-Jan-88	16-Jan-88	22-Jan-88
MEAN TEMP (°C)	6.4	-0.1	3.2	-1.1	1.5	-6.8	-9.4	-12.4	2.8	-4
HIGH TEMP (°C)	9.8	2	7.1	-0.1	3.1	-1.5	-2.1	-8.1	7.9	-1.1
LOW TEMP (°C)	2.9	-2.1	-0.8	-2	-0.2	-12.1	-16.7	-16.6	-2.4	-6.8
WIND DIR.	SW	WNW	S	NW	WSW	N	W	SW	SSW	WSW
WIND SPEED (km/h)	19.2	18.8	17.5	19.3	11	24.5	29.7	11.4	25.7	14.7

	28-Jan-88	3-Feb-88	9-Feb-88	15-Feb-88	21-Feb-88	27-Feb-88	4-Mar-88	10-Mar-88	16-Mar-88	22-Mar-88
MEAN TEMP (°C)	-7	-5.2	-5.8	1	-8.4	-3	-3.6	2.1	-0.8	-3.1
HIGH TEMP (°C)	-3.2	-3.3	-1.9	4.7	-2.1	0.7	0.1	5.3	1.7	2.1
LOW TEMP (°C)	-10.7	-7.1	-9.7	-2.7	-14.6	-6.6	-7.3	-1.2	-3.3	-8.1
WIND DIR.	WNW	NNE	W	W	SW	N	NNE	N	WNW	E
WIND SPEED (km/h)	12.3	13.2	15.8	27.6	24.1	23.8	18.5	14.5	17.6	17.2

Table G1: Meteorological Parameters - Windsor

	28-Mar-88	3-Apr-88	9-Apr-88	15-Apr-88	21-Apr-88	27-Apr-88	3-May-88	9-May-88	15-May-88	21-May-88	27-May-88
MEAN TEMP (°C)	2.3	13.3	5.5	1.8	5.6	6.8	11.1	18.3	19.7	18	21.4
HIGH TEMP (°C)	6.6	18.3	11.5	4.2	11.1	9.7	15.6	22.7	31.2	24.4	14.3
LOW TEMP (°C)	-2	8.3	-0.6	-0.6	0.1	3.8	6.6	13.8	8.1	11.6	28.4
WIND DIR.	ESE	S	NE	W	W	SW	E	S	SSW	SSW	SW
WIND SPEED (km/h)	13.7	17.8	13.3	14.6	13.9	26.5	15.3	28.1	21	8.8	20.1

	2-Jun-88	8-Jun-88	14-Jun-88	20-Jun-88	26-Jun-88	2-Jul-88	8-Jul-88	14-Jul-88	20-Jul-88	26-Jul-88	1-Aug-88
MEAN TEMP (°C)	13.3	13.3	27.4	28.1	19.5	19.3	30.6	29.3	21	22.4	27.5
HIGH TEMP (°C)	17	19.5	35.2	35.5	24.4	27.5	37.5	37.4	23.1	28	34.9
LOW TEMP (°C)	9.6	7.1	19.6	20.6	14.6	11	23.6	21.1	18.8	16.8	20
WIND DIR.	NNE	NE	WSW	SSW	NNW	SSW	W	SW	NE	N	S
WIND SPEED (km/h)	20.1	23	16.3	19.9	22.3	7.8	10.7	23.9	8.8	7	17.3

	7-Aug-88	13-Aug-88	19-Aug-88	25-Aug-88	31-Aug-88	6-Sep-88	12-Sep-88	18-Sep-88	24-Sep-88
MEAN TEMP (°C)	25.5	28.5	20.7	21.2	19	12.5	19.2	23.6	14.4
HIGH TEMP (°C)	31.2	34	24.7	27.4	26	17.8	23.2	29.5	19.6
LOW TEMP (°C)	21.2	23	16.7	15	12	7.2	15.1	17.7	9.1
WIND DIR.	E	SSW	ENE	W	SSW	NW	S	SSW	NE
WIND SPEED (km/h)	9.4	13.8	13.1	24.3	11.6	14.5	16	12.3	10.7

Table G2: Meteorological Parameters - Walpole Island

	16-Jan-88	22-Jan-88	28-Jan-88	3-Feb-88	9-Feb-88	15-Feb-88	21-Feb-88	27-Feb-88	4-Mar-88	10-Mar-88
MEAN TEMP (°C)	2.1	-3.6	-8.4	-5.4	-6.029	1	-10.28	-1.976	-5	1.227
HIGH TEMP (°C)	6.7	-1.6	-5.3	-3.2	-3.75	5.1	-5.461	2.17	-2	4.288
LOW TEMP (°C)	-2	-6	-11.9	-8.6	-10.14	-3.6	-14.29	-4.866	-8.5	-0.487
WIND DIR.	SW	WSW	WNW	ENE	WNW	WSW	W	NNE	NE	NNE
WIND SPEED (km/h)	27.7	18.9	16	25.4	17.79	30.7	31.2	26.73	18.5	14.5

	16-Mar-88	22-Mar-88	28-Mar-88	3-Apr-88	9-Apr-88	15-Apr-88	21-Apr-88	27-Apr-88	3-May-88	9-May-88
MEAN TEMP (°C)	-1.643	-3.956	1.35	12.47	5.5	1.8	4.4	6.2	10.8	18.3
HIGH TEMP (°C)	0.018	0.118	5.159	17.87	11.5	4.2	9	9.5	15.8	22.7
LOW TEMP (°C)	-3.607	-8.59	-1.917	8.17	-0.6	-0.6	-0.4	4.4	4.767	13.8
WIND DIR.	NW	SE	N	SSE	NE	W	NW	SSW	ESE	S
WIND SPEED (km/h)	17.6	17.2	13.7	17.8	12.3	14.6	13.9	26.5	15.3	28.1

	15-May-88	21-May-88	27-May-88	2-Jun-88	8-Jun-88	14-Jun-88	20-Jun-88	26-Jun-88	2-Jul-88	8-Jul-88
MEAN TEMP (°C)	19.7	17.34	20.45	12.3	13.3	25.4	25.98	21.29	16.39	28.7
HIGH TEMP (°C)	31.2	22.87	27.23	16.51	19.5	31.7	31.95	37.09	22.74	34.86
LOW TEMP (°C)	8.1	13.01	15.15	9.81	7.1	19.9	21.54	13.35	8.17	21.31
WIND DIR.	SSW	S	SW	E	NE	WSW	W	NE	NNE	W
WIND SPEED (km/h)	21	8.8	20.1	20.1	23	17	20.52	22.2	14.86	9.6

	14-Jul-88	20-Jul-88	26-Jul-88	1-Aug-88	7-Aug-88	13-Aug-88	19-Aug-88	25-Aug-88	31-Aug-88	6-Sep-88
MEAN TEMP (°C)	26.81	20.49	20.4	27.5	22.47	27.3	18.8	20	18.2	11.9
HIGH TEMP (°C)	32.88	26.13	23.84	34.9	28.14	31.8	26	25.4	24.3	16.7
LOW TEMP (°C)	23.24	15.71	16.37	20	17.06	23.8	13.6	15.4	12.1	7.5
WIND DIR.	W	NNE	WSW	S	N	SW	ENE	W	SW	NW
WIND SPEED (km/h)	21.75	12.06	12.06	17.3	9.37	11.5	11.3	21.6	10.3	13.7

Table G2: Meteorological Parameters - Walpole Island

	12-Sep-88	18-Sep-88	24-Sep-88
MEAN TEMP (°C)	18.8	21.7	14.2
HIGH TEMP (°C)	22.7	27.5	19.7
LOW TEMP (°C)	13.2	18.9	8.1
WIND DIR.	SSW	SW	NE
WIND SPEED (km/h)	13.5	11.1	9.4

Table G3: Concentrations of Selected Pollutants by Wind Direction - Windsor

Compound	N		NNE		NE		ENE	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Phenanthrene (ng/m³)	4	16.37	4	30.30	2	21.91	1	23.56
Anthracene	4	0.81	4	3.91	2	ND	1	1.71
Fluoranthene	4	5.58	4	10.13	2	4.55	1	6.41
Pyrene	4	3.30	4	6.92	2	2.59	1	4.04
Benzo(b)Fluoranthene	4	1.43	4	2.86	2	0.71	1	2.64
Benzo(e)Pyrene	4	0.40	4	0.77	2	0.22	1	0.79
Benzo(a)Pyrene	4	0.24	4	0.37	2	0.17	1	0.84
Indeno(1,2,3-cd)Pyrene	4	0.39	4	1.02	2	0.23	1	0.79
Benzo(g,h,i)Perylene	4	0.45	4	0.68	2	0.25	1	0.69
TOTAL PAH	4	41.99	4	85.46	2	45.06	1	58.21
TOTAL PCDD (pg/m³)	2	2.15	1	7.09	0		0	
TOTAL PCDF	2	0.26	1	1.16	0		0	
CL3-PCB (ng/m³)	3	0.13	2	0.55	1	0.63	0	
CL4-PCB	3	0.07	2	0.50	1	0.15	0	
TOTAL PCB	3	0.22	2	1.51	1	1.07	0	
CL6-CB (ng/m³)	3	0.14	2	0.17	1	0.25	0	
TOTAL CB	3	370	2	1.98	1	3.91	0	
CL5-PHENOL (ng/m³)	3	ND	2	0.71	1	1.47	0	
TOTAL CP	3	0.16	2	1.74	1	2.90	0	
1,3-Butadiene (ppbv)	4	0.13	1	0.07	4	0.21	1	0.11
Benzene	4	0.91	1	0.52	4	0.88	1	0.76
Toluene	4	2.62	1	2.18	4	2.54	1	3.28
m,p-Xylene	4	1.27	1	0.54	4	1.23	1	1.07
o-Xylene	2	0.50	1	0.15	4	0.49	1	0.34
Dichloromethane	4	2.11	1	0.85	4	0.98	1	1.34
1,1,1-Trichloroethane	4	0.57	1	0.31	4	0.39	1	0.48
Trichloroethylene	4	0.36	1	0.07	4	0.09	1	0.20
Tetrachloroethylene	4	0.32	1	0.27	4	0.25	1	0.34
MASS (μg/m³)	4	26	5	26	3	21	1	21
SO4	4	5.05	5	3.96	3	1.96	1	3.03
Al	4	0.686	5	0.664	3	0.098	1	0.257
Ca	4	0.835	5	1.218	3	1.108	1	1.016
Fe	4	0.357	5	0.491	3	0.310	1	0.274
Zn	4	0.076	5	0.094	3	0.034	1	0.030
Cr	4	0.002	5	0.006	3	ND	1	ND
V	4	0.002	5	0.011	3	0.005	1	ND
Cu	4	0.018	5	0.018	3	ND	1	0.007
Mn	4	0.018	5	0.026	3	0.015	1	0.017

Table G3: Concentrations of Selected Pollutants by Wind Direction - Windsor

Compound	E No.	E Mean	ESE No.	ESE Mean	SE No.	SE Mean	SSE No.	SSE Mean
Phenanthrene (ng/m³)	3	20.99	2	22.93	1	19.15	0	
Anthracene	3	0.24	2	0.78	1	ND	0	
Fluoranthene	3	4.65	2	6.06	1	8.96	0	
Pyrene	3	2.48	2	3.85	1	4.98	0	
Benzo(b)Fluoranthene	3	0.85	2	1.35	1	0.66	0	
Benzo(e)Pyrene	3	0.20	2	0.33	1	0.16	0	
Benzo(a)Pyrene	3	0.16	2	0.22	1	0.08	0	
Indeno(1,2,3-cd)Pyrene	3	0.25	2	0.37	1	0.13	0	
Benzo(g,h,i)Perylene	3	0.20	2	0.42	1	0.13	0	
TOTAL PAH	3	39.17	2	53.45	1	44.26	0	
TOTAL PCDD (pg/m³)	0		1	1.88	0		0	
TOTAL PCDF	0		1	0.14	0		0	
CL3-PCB (ng/m³)	0		1	0.55	0		0	
CL4-PCB	0		1	0.38	0		0	
TOTAL PCB	0		1	1.26	0		0	
CL6-CB (ng/m³)	0		1	0.08	0		0	
TOTAL CB	0		1	1.66	0		0	
CL5-PHENOL (ng/m³)	0		1	1.34	0		0	
TOTAL CP	0		1	2.75	0		0	
1,3-Butadiene (ppbv)	2	0.06	1	0.25	0		0	
Benzene	2	0.60	1	1.23	0		0	
Toluene	2	2.90	1	2.82	0		0	
m,p-Xylene	2	1.20	1	1.94	0		0	
o-Xylene	2	0.40	1	0.69	0		0	
Dichloromethane	2	1.00	0		0		0	
1,1,1-Trichloroethane	2	0.61	0		0		0	
Trichloroethylene	2	0.51	1	1.10	0		0	
Tetrachloroethylene	2	0.23	1	0.72	0		0	
MASS (μg/m³)	2	39	2	31	1	40	0	
SO4	2	5.21	2	5.79	1	12.04	0	
Al	2	0.775	2	1.814	1	0.938	0	
Ca	2	1.332	2	0.418	1	1.023	0	
Fe	2	0.792	2	0.234	1	0.299	0	
Zn	2	0.204	2	0.039	1	0.044	0	
Cr	2	0.005	2	0.008	1	0.005	0	
V	2	0.004	2	0.003	1	0.007	0	
Cu	2	0.002	2	0.024	1	0.026	0	
Mn	2	0.039	2	0.017	1	0.016	0	

Table G3: Concentrations of Selected Pollutants by Wind Direction - Windsor

Compound	S No.	S Mean	SSW No.	SSW Mean	SW No.	SW Mean	WSW No.	WSW Mean
Phenanthrene (ng/m³)	9	39.33	8	46.29	4	33.93	2	67.14
Anthracene	9	4.83	8	3.43	4	2.51	2	20.41
Fluoranthene	9	13.56	8	14.18	4	13.77	2	24.20
Pyrene	9	8.35	8	8.00	4	8.69	2	15.82
Benzo(b)Fluoranthene	9	3.27	8	3.64	4	5.94	2	6.82
Benzo(e)Pyrene	9	1.03	8	0.92	4	1.02	2	2.83
Benzo(a)Pyrene	9	0.75	8	0.68	4	1.26	2	2.57
Indeno(1,2,3-cd)Pyrene	9	1.35	8	1.01	4	1.51	2	3.37
Benzo(g,h,i)Perylene	9	0.80	8	0.73	4	1.31	2	2.33
TOTAL PAH	9	108.32	8	106.54	4	100.68	2	262.57
TOTAL PCDD (pg/m³)	2	1.53	2	2.42	0		0	
TOTAL PCDF	2	0.21	2	0.34	0		0	
CL3-PCB (ng/m³)	4	0.17	3	0.20	1	0.03	0	
CL4-PCB	4	0.20	3	0.57	1	ND	0	
TOTAL PCB	4	0.54	3	1.12	1	0.06	0	
CL6-CB (ng/m³)	4	0.16	3	0.19	1	0.10	0	
TOTAL CB	4	5.32	3	1.80	1	0.90	0	
CL5-PHENOL (ng/m³)	4	0.71	3	1.61	1	ND	0	
TOTAL CP	4	1.79	3	3.32	1	ND	0	
1,3-Butadiene (ppbv)	8	0.29	10	0.33	6	0.11	4	0.22
Benzene	8	1.32	10	1.62	6	1.07	4	1.78
Toluene	8	4.57	10	4.83	6	2.35	4	7.15
m,p-Xylene	8	1.81	10	1.83	6	1.01	4	2.65
o-Xylene	8	0.59	10	0.62	6	0.53	4	0.84
Dichloromethane	3	1.36	8	1.47	5	1.42	3	2.04
1,1,1-Trichloroethane	3	0.36	8	0.44	5	0.69	3	0.88
Trichloroethylene	8	0.74	10	0.30	6	0.23	4	0.44
Tetrachloroethylene	8	0.42	10	0.23	6	0.16	4	0.35
MASS (μg/m³)	7	44	10	46	6	37	4	57
SO4	7	9.66	10	10.47	6	5.65	4	9.41
Al	7	1.740	10	1.244	6	0.498	4	1.690
Ca	7	1.047	10	1.327	6	1.128	4	1.628
Fe	7	0.887	10	1.149	6	0.896	4	1.088
Zn	7	0.140	10	0.310	6	0.152	4	0.158
Cr	7	0.012	10	0.010	6	0.003	4	0.012
V	7	0.011	10	0.007	6	0.003	4	0.012
Cu	7	0.024	10	0.012	6	0.004	4	0.014
Mn	7	0.035	10	0.047	6	0.042	4	0.049

Table G3: Concentrations of Selected Pollutants by Wind Direction - Windsor

Compound	W		WNW		NW		NNW	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Phenanthrene (ng/m³)	9	38.35	3	20.56	1	10.75	1	19.43
Anthracene	9	2.46	3	3.39	1	1.12	1	0.43
Fluoranthene	9	9.81	3	6.42	1	2.90	1	5.21
Pyrene	9	6.64	3	4.94	1	2.49	1	2.97
Benzo(b)Fluoranthene	9	3.01	3	2.40	1	0.36	1	2.08
Benzo(e)Pyrene	9	0.71	3	0.55	1	0.29	1	0.51
Benzo(a)Pyrene	9	0.52	3	0.24	1	0.20	1	0.64
Indeno(1,2,3-cd)Pyrene	9	1.11	3	0.65	1	0.61	1	0.58
Benzo(g,h,i)Perylene	9	0.86	3	0.76	1	0.35	1	0.42
TOTAL PAH	9	97.32	3	69.69	1	31.77	1	46.61
TOTAL PCDD (pg/m³)	4	1.22	0		0		0	
TOTAL PCDF	4	0.47	0		0		0	
CL3-PCB (ng/m³)	3	0.16	0		0		1	0.26
CL4-PCB	3	0.48	0		0		1	0.19
TOTAL PCB	3	0.90	0		0		1	1.01
CL6-CB (ng/m³)	3	0.10	0		0		1	0.13
TOTAL CB	3	4.05	0		0		1	2.04
CL5-PHENOL (ng/m³)	3	1.30	0		0		1	0.75
TOTAL CP	3	2.48	0		0		1	1.52
1,3-Butadiene (ppbv)	10	0.24	1	0.18	2	0.20	1	0.13
Benzene	10	1.50	1	1.21	2	1.16	1	0.71
Toluene	10	5.29	1	3.00	2	4.24	1	3.14
m,p-Xylene	10	2.43	1	1.09	2	1.87	1	1.23
o-Xylene	10	0.82	1	0.37	2	0.59	1	0.38
Dichloromethane	5	1.35	0		1	1.01	1	0.61
1,1,1-Trichloroethane	5	0.40	0		1	0.29	1	0.39
Trichloroethylene	10	0.69	1	0.65	2	0.59	1	0.17
Tetrachloroethylene	10	0.71	1	0.86	2	0.40	1	0.17
MASS (μg/m³)	10	40	3	21	2	12	1	19
SO4	10	6.51	3	2.41	2	1.44	1	1.60
Al	10	1.113	3	0.282	2	0.202	1	0.749
Ca	10	1.141	3	0.677	2	0.581	1	0.436
Fe	10	0.707	3	0.340	2	0.219	1	0.156
Zn	10	0.109	3	0.093	2	0.055	1	0.009
Cr	10	0.009	3	0.003	2	0.002	1	ND
V	10	0.010	3	0.002	2	ND	1	ND
Cu	10	0.011	3	0.015	2	0.010	1	ND
Mn	10	0.034	3	0.019	2	0.013	1	0.004

Table G4: Concentrations of Selected Pollutants by Wind Direction - Walpole Island

Compound	N		NNE		NE		ENE	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Phenanthrene (ng/m³)	2	3.26	4	2.22	2	6.18	0	ND
Anthracene	2	ND	4	ND	2	1.00	0	ND
Fluoranthene	2	0.68	4	0.40	2	2.05	0	ND
Pyrene	2	0.37	4	0.21	2	1.56	0	ND
Benzo(b)Fluoranthene	2	0.13	4	0.12	2	0.68	0	ND
Benzo(e)Pyrene	2	0.04	4	0.03	2	0.17	0	ND
Benzo(a)Pyrene	2	0.03	4	0.02	2	0.10	0	ND
Indeno(1,2,3-cd)Pyrene	2	0.04	4	0.02	2	0.20	0	ND
Benzo(g,h,i)Perylene	2	0.04	4	0.02	2	0.14	0	ND
TOTAL PAH	2	6.44	4	4.54	2	18.74	0	ND
TOTAL PCDD (pg/m³)	0	ND	1	0.11	0	ND	0	ND
TOTAL PCDF	0	ND	1	ND	0	ND	0	ND
CL3-PCB (ng/m³)	0	ND	3	ND	1	ND	0	ND
CL4-PCB	0	ND	3	ND	1	ND	0	ND
TOTAL PCB	0	ND	3	ND	1	ND	0	ND
CL6-CB (ng/m³)	0	ND	3	0.11	1	0.16	0	ND
TOTAL CB	0	ND	3	1.15	1	0.71	0	ND
CL5-PHENOL (ng/m³)	0	ND	3	0.11	1	0.17	0	ND
TOTAL CP	0	ND	3	0.99	1	1.74	0	ND
1,3-Butadiene (ppbv)	2	0.02	2	0.05	3	0.05	1	0.04
Benzene	2	0.25	2	0.48	3	0.38	1	0.37
Toluene	2	0.39	2	0.72	3	0.59	1	0.87
m,p-Xylene	2	0.26	2	0.38	3	0.37	1	0.72
o-Xylene	2	0.12	2	0.14	3	0.14	1	0.20
Dichloromethane	2	0.39	2	0.34	3	0.34	1	0.36
1,1,1-Trichloroethane	2	0.22	2	0.21	3	0.33	1	0.39
Trichloroethylene	2	0.06	2	0.07	3	0.08	1	0.31
Tetrachloroethylene	2	0.04	2	0.07	3	0.08	1	0.06
MASS (μg/m³)	0	ND	3	17	1	14	1	23
SO4	0	ND	3	1.67	1	2.11	1	1.04
Al	0	ND	3	0.159	1	0.150	1	0.044
Ca	0	ND	3	0.361	1	0.206	1	0.696
Fe	0	ND	3	0.105	1	0.056	1	0.128
Zn	0	ND	3	0.008	1	0.016	1	0.007
Cr	0	ND	3	ND	1	ND	1	ND
V	0	ND	3	0.004	1	0.013	1	ND
Cu	0	ND	3	0.005	1	0.016	1	ND
Mn	0	ND	3	0.005	1	ND	1	0.004

Table G4: Concentrations of Selected Pollutants by Wind Direction - Walpole Island

Compound	E		ESE		SE		SSE	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Phenanthrene (ng/m³)	1	1.16	1	1.66	1	1.58	1	2.66
Anthracene	1	ND	1	ND	1	ND	1	ND
Fluoranthene	1	0.27	1	0.83	1	0.69	1	0.79
Pyrene	1	0.15	1	0.37	1	0.36	1	0.33
Benzo(b)Fluoranthene	1	0.09	1	0.51	1	0.36	1	0.46
Benzo(e)Pyrene	1	0.03	1	0.13	1	0.09	1	0.10
Benzo(a)Pyrene	1	ND	1	0.10	1	0.08	1	0.10
Indeno(1,2,3-cd)Pyrene	1	ND	1	0.12	1	0.09	1	0.12
Benzo(g,h,i)Perylene	1	ND	1	0.08	1	0.08	1	0.07
TOTAL PAH	1	3.39	1	5.60	1	4.90	1	6.97
TOTAL PCDD (pg/m³)	0	ND	0	ND	0	ND	1	0.98
TOTAL PCDF	0	ND	0	ND	0	ND	1	ND
CL3-PCB (ng/m³)	1	ND	0	ND	1	ND	1	0.03
CL4-PCB	1	ND	0	ND	1	ND	1	ND
TOTAL PCB	1	ND	0	ND	1	ND	1	0.03
CL6-CB (ng/m³)	1	0.15	0	ND	1	0.13	1	0.15
TOTAL CB	1	1.41	0	ND	1	2.02	1	2.37
CL5-PHENOL (ng/m³)	1	0.15	0	ND	1	0.18	1	0.77
TOTAL CP	1	1.28	0	ND	1	0.35	1	1.17
1,3-Butadiene (ppbv)	0	ND	1	ND	0	ND	0	ND
Benzene	0	ND	1	0.21	0	ND	0	ND
Toluene	0	ND	1	1.45	0	ND	0	ND
m,p-Xylene	0	ND	1	0.39	0	ND	0	ND
o-Xylene	0	ND	1	0.16	0	ND	0	ND
Dichloromethane	0	ND	1	ND	0	ND	0	ND
1,1,1-Trichloroethane	0	ND	1	0.16	0	ND	0	ND
Trichloroethylene	0	ND	1	0.10	0	ND	0	ND
Tetrachloroethylene	0	ND	1	0.06	0	ND	0	ND
MASS (μg/m³)	0	ND	1	25	0	ND	0	ND
SO4	0	ND	1	3.25	0	ND	0	ND
Al	0	ND	1	0.585	0	ND	0	ND
Ca	0	ND	1	1.197	0	ND	0	ND
Fe	0	ND	1	0.301	0	ND	0	ND
Zn	0	ND	1	0.016	0	ND	0	ND
Cr	0	ND	1	ND	0	ND	0	ND
V	0	ND	1	ND	0	ND	0	ND
Cu	0	ND	1	0.016	0	ND	0	ND
Mn	0	ND	1	0.010	0	ND	0	ND

Table G4: Concentrations of Selected Pollutants by Wind Direction - Walpole Island

Compound	S		SSW		SW		WSW	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Phenanthrene (ng/m³)	3	6.42	1	2.73	1	3.24	2	2.73
Anthracene	3	ND	1	ND	1	ND	2	ND
Fluoranthene	3	1.40	1	0.79	1	1.14	2	0.57
Pyrene	3	0.63	1	0.33	1	0.50	2	0.26
Benzo(b)Fluoranthene	3	0.43	1	0.36	1	0.39	2	0.14
Benzo(e)Pyrene	3	0.10	1	0.09	1	0.11	2	0.03
Benzo(a)Pyrene	3	0.07	1	0.09	1	0.11	2	ND
Indeno(1,2,3-cd)Pyrene	3	0.02	1	0.12	1	0.11	2	ND
Benzo(g,h,i)Perylene	3	0.07	1	0.08	1	0.10	2	ND
TOTAL PAH	3	14.42	1	6.74	1	7.65	2	5.91
TOTAL PCDD (pg/m³)	2	0.30	0	ND	0	ND	2	1.19
TOTAL PCDF	2	0.06	0	ND	0	ND	2	ND
CL3-PCB (ng/m³)	3	ND	0	ND	0	ND	1	ND
CL4-PCB	3	ND	0	ND	0	ND	1	ND
TOTAL PCB	3	ND	0	ND	0	ND	1	ND
CL6-CB (ng/m³)	3	0.22	0	ND	0	ND	1	0.13
TOTAL CB	3	2.78	0	ND	0	ND	1	2.30
CL5-PHENOL (ng/m³)	3	1.14	0	ND	0	ND	1	ND
TOTAL CP	3	2.86	0	ND	0	ND	1	0.09
1,3-Butadiene (ppbv)	3	0.01	3	0.02	4	0.06	4	0.13
Benzene	3	0.44	3	0.34	4	0.51	4	0.57
Toluene	3	2.41	3	0.96	4	1.45	4	1.57
m,p-Xylene	3	1.37	3	0.64	4	0.82	4	0.77
o-Xylene	3	0.35	3	0.20	4	0.26	4	0.57
Dichloromethane	3	0.34	3	0.43	4	1.54	4	0.69
1,1,1-Trichloroethane	3	0.27	3	0.30	4	0.52	4	0.30
Trichloroethylene	3	0.35	3	0.15	4	0.25	4	0.15
Tetrachloroethylene	3	0.14	3	0.09	4	0.15	4	0.09
MASS (μg/m³)	2	35	2	22	2	15	4	33
SO4	2	6.60	2	3.18	2	1.82	4	5.75
Al	2	0.724	2	0.084	2	0.132	4	0.239
Ca	2	0.414	2	0.330	2	0.525	4	0.551
Fe	2	0.378	2	0.167	2	0.157	4	0.308
Zn	2	0.025	2	0.027	2	0.020	4	0.040
Cr	2	ND	2	ND	2	ND	4	0.001
V	2	ND	2	ND	2	ND	4	0.002
Cu	2	0.008	2	0.007	2	0.002	4	0.007
Mn	2	0.013	2	0.008	2	0.006	4	0.015

Table G4: Concentrations of Selected Pollutants by Wind Direction - Walpole Island

Compound	W		WNW		NW		NNW	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Phenanthrene (ng/m³)	5	3.03	1	4.58	1	1.70	0	ND
Anthracene	5	0.03	1	ND	1	ND	0	ND
Fluoranthene	5	0.76	1	1.59	1	0.49	0	ND
Pyrene	5	0.36	1	0.69	1	0.20	0	ND
Benzo(b)Fluoranthene	5	0.30	1	0.79	1	0.20	0	ND
Benzo(e)Pyrene	5	0.09	1	0.23	1	0.06	0	ND
Benzo(a)Pyrene	5	0.09	1	0.15	1	0.04	0	ND
Indeno(1,2,3-cd)Pyrene	5	0.04	1	0.25	1	0.06	0	ND
Benzo(g,h,i)Perylene	5	0.06	1	0.21	1	0.06	0	ND
TOTAL PAH	5	6.63	1	13.77	1	3.93	0	ND
TOTAL PCDD (pg/m³)	2	ND	0	ND	0	ND	0	ND
TOTAL PCDF	2	ND	0	ND	0	ND	0	ND
CL3-PCB (ng/m³)	2	0.04	0	ND	0	ND	0	ND
CL4-PCB	2	ND	0	ND	0	ND	0	ND
TOTAL PCB	2	0.04	0	ND	0	ND	0	ND
CL6-CB (ng/m³)	2	0.21	0	ND	0	ND	0	ND
TOTAL CB	2	2.04	0	ND	0	ND	0	ND
CL5-PHENOL (ng/m³)	2	0.48	0	ND	0	ND	0	ND
TOTAL CP	2	1.28	0	ND	0	ND	0	ND
1,3-Butadiene (ppbv)	3	0.03	2	0.20	2	0.03	0	ND
Benzene	3	0.37	2	0.57	2	0.24	0	ND
Toluene	3	1.78	2	1.76	2	0.67	0	ND
m,p-Xylene	3	0.62	2	0.71	2	0.54	0	ND
o-Xylene	3	0.22	2	0.41	2	0.17	0	ND
Dichloromethane	3	0.31	2	0.74	2	0.21	0	ND
1,1,1-Trichloroethane	3	0.25	2	0.31	2	0.29	0	ND
Trichloroethylene	3	0.12	2	0.08	2	0.05	0	ND
Tetrachloroethylene	3	0.07	2	0.09	2	0.06	0	ND
MASS (μg/m³)	3	51	2	25	2	9	0	ND
SO4	3	13.01	2	3.85	2	1.58	0	ND
Al	3	0.415	2	0.254	2	0.060	0	ND
Ca	3	0.903	2	0.485	2	0.171	0	ND
Fe	3	0.456	2	0.188	2	0.073	0	ND
Zn	3	0.049	2	0.050	2	0.013	0	ND
Cr	3	0.003	2	ND	2	ND	0	ND
V	3	0.005	2	ND	2	ND	0	ND
Cu	3	0.005	2	0.011	2	0.005	0	ND
Mn	3	0.018	2	0.011	2	0.001	0	ND